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January 14, 2015

United States Environmental Protection Agency
Region 5
LU-9J
77 West Jackson Boulevard
Chicago, Illinois 60604-3507

Attention: Mr. Don Heller

Reference: Quarterly Progress Report
Administrative Order on Consent
U.S. EPA Docket No.: RCRA-05-2010-0014
EMD Millipore Corporation
Norwood, Ohio Facility
Project No. 213083.0001

Dear Mr. Heller:

TRC Environmental Corporation (TRC) is pleased to submit, on behalf of EMD Millipore Corporation, formerly known as EMD Chemical Inc. (EMD), the attached Quarterly Technical Progress Report. The Quarterly Progress Report is a requirement of the Administrative Order on Consent (AOC) with the United States Environmental Protection Agency (U.S. EPA), Region 5, to address releases of hazardous waste or hazardous constituents at its facility located at 2909 Highland Avenue, Cincinnati, Ohio.

Should you have any questions regarding the enclosed document, please contact either of us at (513) 489-2255 or via e-mail at JWasserbauer@trcsolutions.com or CKugler@trcsolutions.com.

Sincerely,

TRC Environmental Corporation

James A. Wasserbauer. LPG
Senior Project Manager

Curtis S. Kugler
Project Manager

cc: Mr. Scott Chase – EMD Millipore (electronic only)
Sherry L. Estes, Esq. – U.S. EPA, Region 5
Mark A. Norman, Esq. – Vorys, Sater, Seymour & Pease LLP (electronic only)

14-1061LTR/cau

QUARTERLY PROGRESS REPORT – FOURTH QUARTER 2014
(10/01/2014 – 12/31/2014)
EMD Millipore Corporation, Norwood, Ohio

A. IDENTIFICATION OF FACILITY AND ACTIVITY

The EMD Millipore Corporation (EMD) facility is located at 2909 Highland Avenue, Norwood, Ohio. EMD is conducting corrective measures to address releases of hazardous waste or hazardous constituents at the facility. The U.S. EPA submitted the Notification of Final Decision to EMD on November 5, 2008, and issued the fully executed copy of the 3008(h) Administrative Order on Consent (AOC) and Certificate of Incumbency on March 31, 2010. The *Containment Corrective Measures Operation and Maintenance Plan – Retaining Wall and Groundwater Collection Trench* was submitted to the U.S. EPA on January 10, 2014 and subsequently approved via letter on May 21, 2014. This Quarterly Progress Report is being submitted to fulfill the quarterly reporting requirements of this plan. This is the fourth Quarterly Progress Report submitted under this plan.

Copies of the Quarterly Progress Reports have also been filed at the public repository established by EMD at the Cincinnati Public Library (Norwood Branch) located at 4325 Montgomery Road, Cincinnati, Ohio.

B. STATUS AND PROGRESS DURING THE REPORTING PERIOD

This report includes a summary of work performed and data collected since completion of the ground water treatment system, secant pile wall and ground water collection trench, and the concrete cover system of the final corrective measures in 2013.

1. Performance Monitoring

a. In accordance with the Ground Water Monitoring Plan (GWMP), performance monitoring was conducted during the week of October 20, 2014 by the collection of ground water samples. Laboratory results from the surface water samples, onsite and offsite monitoring wells and QA/QC results are summarized in the attached Tables 1 through 3. A comparison of the chemicals of concern at the points of compliance (Property boundary) indicates that all results are below the risk-based clean-up standards summarized in the GWMP. Additionally, analytical results from non-compliance ground water monitoring well samples indicate concentrations of 1,4-dioxane and volatile organic compounds (VOCs) are within historical concentration ranges.

   Laboratory analytical results have been validated by the TRC data validation coordinator. Appendix I includes the data validation memorandum.

   Laboratory analytical reports and electronic data files are included as a CD in Appendix II.

b. Ground water levels were recorded on October 20, 2014 from all the monitoring wells on and off the property for the demonstration that hydraulic control is being achieved by the corrective measures. This is the fourth water level recording event since completion of the construction activities. Prior to the corrective measures being complete, ground water flow maps from the Upper Sand Unit

and Lower Clay Unit were prepared to show the on and off property hydraulic characteristics associated with the performance of the interim measure (French Drain) and offsite migration characteristics from the West Ravine. Figures 2 and 3 show the ground water contours for the Upper Sand and Lower Clay Units, respectively. Table 4 provides the ground water data from the monitoring well network. Ground water measurements have also been collected from the ground water intercept trench since April 2014 and are included in Table 5 and Chart 1. The ground water interceptor trench intersects both the Upper Sand and Lower Clay Units. Figure 2 shows the ground water contours of the Upper Sand Unit with the ground water intercept trench water level data. Figure 3 shows the ground water contours of the Lower Clay Unit with the ground water intercept trench wells. As the facility continues performance monitoring of the corrective measures, the ground water measurements and flow directions from these Units and the other water level measurements collected during quarterly events will be evaluated and compared to historical and the future quarterly events planned through 2015. The data collected from the 2014 events is utilized to establish a baseline for post remedy ground water flow direction and hydraulic containment.

2. Operation and Maintenance

a. Monitoring of the effluent of the permanent ground water treatment system was performed during this period on November 25, 2014 and December 18, 2014. The effluent sampling results are currently being reviewed to evaluate the performance of the treatment system. The effluent sampling results are summarized in Table 6.

b. Visual inspections of the remedy components, which consists of the entire concrete surface cover in the area of the remediation system and the retaining wall and all joints, were conducted on December 4, 2014 by Lithko Restoration Technologies.. The visual inspections were conducted to determine if subsidence, erosion or significant fractures have occurred during this reporting period. No subsidence, erosion or significant fractures were observed during these visual observations. However, several small cracks and joint deteriorations were observed during the visual inspections. These will continue to be inspected in future quarterly inspections and corrective action will be taken if appropriate. Appendix III includes the inspection records.

3. Tank Farm *In-Situ* Chemical Oxidation Injections

Conestoga-Rovers Associates (CRA) conducted the three month ground water sampling event following the second *in-Situ* Chemical Oxidation (ISCO) injection event between October 20, 2014 and October 22, 2014.

A copy of the CRA sampling report is included in Appendix IV.

C. EVALUATION OF HYDRAULIC CONTAINMENT

As referenced in Section B1, ground water levels were recorded from the ground water interceptor trench wells on October 2, 2014. Water level measurements on October 20, 2014 from performance monitoring wells installed within the Upper Sand and Lower Clay Units as well as the interceptor trench wells were utilized for the demonstration that hydraulic containment is being achieved by the corrective measures. Figures 2 and 3 show the ground water contours for the Upper Sand and Lower Clay Units, respectively. The

ground water interceptor trench water levels are shown in the Chart 1. Since the completion of the corrective measures, ground water depressions have developed in both the Upper Sand unit with in the area of the West Ravine, and in the Lower Clay unit on both sides of the secant pile wall. These depressions will continue to be evaluated in future ground water measurement events.

Ground water measurements and elevations have been recorded quarterly from the performance monitoring wells during 2014. Chart 2 shows the ground water elevations for each performance well and includes the maximum and minimum recorded elevation. The 2014 results will be utilized as a baseline and provides the demonstration that hydraulic containment is being achieved. Future ground water measurements and elevations will continue to be recorded and compared to the 2014 baseline maximum and minimum recorded elevations at each location observed in 2014. Ground water contouring will only be conducted to further evaluate hydraulic containment if the current quarter's ground water measurements are outside the 2014 baseline referenced above.

D. RESULTS OF COC SAMPLING AND MONITORING

The results of the COC sampling and monitoring of the second event conducted after the completion of the corrective measures indicates that all results are below the risk-based clean-up standards. Table 1 summarizes the sampling results compared to the risk-based clean-up standards. These results will be compared to future events to demonstrate that COCs in the ground water are stable.

E. SUMMARY OF PERFORMANCE OF CORRECTIVE MEASURE

The results of the Performance Monitoring and inspections of the remedy components indicate the final corrective measures are performing as designed. These performances will continue to be evaluated in accordance with the GWMP and Operation and Maintenance Plan.

F. SUMMARY OF STAKEHOLDER CORRESPONDENCE

The 2014 third quarter *Quarterly Progress Report* prepared by TRC, dated October 14, 2014, was submitted to the U.S. EPA on October 14, 2014. CRA prepared and submitted the *Report for Groundwater Performance Sampling*, dated November 12, 2014 to the Ohio EPA UIC Program.

G. PROJECT SCHEDULE

During this reporting period, the project schedule, personnel updates, and any summaries of correspondence to/from U.S. EPA are summarized below.

- There have been no changes to the project schedule during this reporting period.

H. 2015 FIRST QUARTER PROJECTED ACTIVITIES

The following activities are planned for next reporting period.

- Ground water elevations will be recorded in January 2015 at all monitoring wells. This will be the fifth event since completion of the construction activities and will be

utilized for the evaluation of the hydraulic characteristics compared to the monitoring events conducted in 2014.

- The six month post ISCO sampling and analysis at the former tank farm area monitoring wells will be conducted by CRA in January 2015.
- Ongoing inspection and monitoring of the remedy as defined in the Containment Corrective Measures Operation and Maintenance Plan – Retaining Wall and Ground Water Collection Trench.
- Continued review of effluent sampling results to evaluate performance of the treatment system.

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TABLES

EMD Chemicals Inc.
Norwood, Ohio
U.S. EPA ID No. OHD086438538
Project No. 213083.0000

TABLE 1: Quarterly Ground Water VOC Results (October 2014)

Analyte	Risk-Based Cleanup Standards UG/L	DW001 10/20/2014 GW 240-43355-3 UG/L	DW002 10/20/2014 GW 240-43355-4 UG/L	DW003 10/20/2014 GW 240-43355-5 UG/L	DW004 10/20/2014 GW 240-43355-6 UG/L	MW001R 10/22/2014 GW 240-43416-12 UG/L	MW011A 10/22/2014 GW 240-43416-9 UG/L	MW015BR 10/22/2014 GW 240-43416-13 UG/L	MW015R 10/22/2014 GW 240-43416-14 UG/L	MW016 10/23/2014 GW 240-43473-1 UG/L	MW021A 10/22/2014 GW 240-43416-15 UG/L	MW025 10/22/2014 GW 240-43416-16 UG/L	MW026AR 10/22/2014 GW 240-43416-11 UG/L	MW026R 10/22/2014 GW 240-43416-10 UG/L	MW030 10/23/2014 GW 240-43473-3 UG/L	MW031A 10/21/2014 GW 240-43355-21 UG/L	MW031B 10/22/2014 GW 240-43416-1 UG/L	MW031B 10/22/2014 GWDUP 240-43416-4 UG/L	MW031C 10/22/2014 GW 240-43416-8 UG/L	MW031D 10/21/2014 GW 240-43355-22 UG/L
1,1,1,2-TETRACHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
1,1,1-TRICHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	16 J	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U *	< 1 U	< 10 U	< 3.3 U
1,1,2,2-TETRACHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	23 J	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U *	< 1 U	< 1 U	< 10 U	< 3.3 U *
1,1,2-TRICHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
1,1-DICHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	26 J	77	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	12	0.89 J
1,1-DICHLOROETHENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	2.7 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
1,2,3-TRICHLOROPROPANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U *	< 1 U	< 1 U	< 10 U	< 3.3 U *
1,2-DIBROMO-3-CHLOROPROPANE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U
1,2-DICHLOROETHANE	13,000	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	300	870	16	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	35	0.75 J	0.73 J	64	130
1,2-DICHLOROETHENE, TOTAL	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	78	26	0.24 J	< 2 U	< 2 U	< 2 U	< 2 U	360	7.7	6.7	14 J	94
1,2-DICHLOROPROPANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
1,4-DIOXANE	1,000,000	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	1300	< 1700 U	1100	< 50 U	< 50 U	< 50 U	< 50 U	91	6800	390	540 j	5900	1300
2-BUTANONE	–	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 330 U	< 40 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 10 U	< 10 U	< 100 U	< 33 U
2-HEXANONE	–	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 330 U	< 40 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 10 U	< 10 U	< 100 U	< 33 U
3-CHLORO-1-PROPENE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U
4-METHYL-2-PENTANONE (MIBK)	–	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 330 U	< 40 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U *	< 10 U	< 10 U	< 100 U	< 33 U *
ACETONE	–	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 330 U	< 40 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 130 U	< 10 U	< 10 U	< 100 U	< 33 U
ACETONITRILE	–	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 270 U	< 670 U	< 80 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 250 U	< 20 U	< 20 U	< 200 U	< 67 U
ACROLEIN	–	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 270 U	< 670 U	< 80 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 250 U	< 20 U	< 20 U	< 200 U	< 67 U
ACRYLONITRILE	–	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 270 U	< 670 U	< 80 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 250 U	< 20 U	< 20 U	< 200 U	< 67 U
BENZENE	2,000	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	23 J	1.4 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	7.1 J	0.32 J	0.38 J	2.9 J	< 3.3 U
BROMODICHLOROMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
BROMOFORM	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
BROMOMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
CARBON DISULFIDE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	3	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
CARBON TETRACHLORIDE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	17 J	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
CHLOROBENZENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	2.7 J	< 1 U	< 1 U	< 10 U	< 3.3 U
CHLOROETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
CHLOROFORM	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	370	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	0.42 J	0.44 J	< 10 U	< 3.3 U
CHLOROMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
CHLOROPRENE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U
CIS-1,2-DICHLOROETHENE	9,400	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	78	24	0.24 J	< 1 U	< 1 U	< 1 U	< 1 U	350	7.3	6.4	14	92
CIS-1,3-DICHLOROPROPENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
DIBROMOCHLOROMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
DIBROMOMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
DICHLORODIFLUOROMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
ETHYL METHACRYLATE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
ETHYLBENZENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
ETHYLENE DIBROMIDE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
IODOMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
ISOBUTANOL	–	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 670 U	< 1700 U	< 200 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 630 U	< 50 U	< 50 U	< 500 U	< 170 U
METHACRYLONITRILE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U
METHYL METHACRYLATE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U
METHYLENE CHLORIDE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	18 Bu	30 J Bu	2.9 J Bu	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	35 Bu	< 3.3 U
PROPIONITRILE	–	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 53 U	< 130 U	< 16 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 50 U	< 4 U	< 4 U	< 40 U	< 13 U
STYRENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
TETRACHLOROETHENE	280	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	72	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	79	0.58 J	0.47 J	< 10 U	0.8 J
TOLUENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
TRANS-1,2-DICHLOROETHENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	1.6 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	9.5 J	0.4 J	0.32 J	< 10 U	1.7 J
TRANS-1,3-DICHLOROPROPENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
TRANS-1,4-DICHLORO-2-BUTENE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
TRICHLOROETHENE	3,500	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	580	15	< 1 U	0.16 J	< 1 U	< 1 U	0.4 J	470	2.7	2.5	3.1 J	51
TRICHLOROFLUOROMETHANE	–	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 33 U	< 4 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 13 U	< 1 U	< 1 U	< 10 U	< 3.3 U
VINYL ACETATE	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U *	< 2 U	< 20 U	< 6.7 U
VINYL CHLORIDE	1,250	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	6.4 J	< 33 U	16	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	92	4.4	3.9	3.8 J	18
XYLENES, TOTAL	–	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 27 U	< 67 U	< 8 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 25 U	< 2 U	< 2 U	< 20 U	< 6.7 U

See data validation memo for definitions of data qualifiers.
VOCs = Volatile Organic Compounds
GW = Ground Water
DUP = Duplicate Sample
RE = Laboratory Reanalyzed Sample
µg/L = micrograms per liter

EMD Chemicals Inc.
Norwood, Ohio
U.S. EPA ID No. OHD086438538
Project No. 213083.0000

TABLE 1: Quarterly Ground Water VOC Results (Octobe

Analyte	Risk-Based Cleanup Standards UG/L	MW041 10/22/2014 GW 240-43416-7 UG/L	MW043AR 10/23/2014 GW 240-43473-4 UG/L	MW044 10/22/2014 GW 240-43416-6 UG/L	MW505A 10/21/2014 GW 240-43355-13 UG/L	MW505B 10/21/2014 GW 240-43355-14 UG/L	MW508 10/21/2014 GW 240-43355-19 UG/L	MW508B 10/21/2014 GW 240-43355-20 UG/L	MW509A 10/21/2014 GW 240-43355-15 UG/L	MW509B 10/21/2014 GW 240-43355-16 UG/L	MW510A 10/21/2014 GW 240-43355-17 UG/L	MW510B 10/21/2014 GW 240-43355-18 UG/L	P006 10/23/2014 GW 240-43473-2 UG/L	VE542/04_5-09_5 10/21/2014 GWSC 240-43473-5 UG/L	VE542/04_5-09_5 10/23/2014 GWDUP 240-43473-6 UG/L	VE542/11_5-16_5 10/21/2014 GWSC 240-43355-10 UG/L	WRPZ05 10/21/2014 GW 240-43355-9 UG/L	WRPZ10 10/21/2014 GW 240-43355-11 UG/L	WRPZ15 10/21/2014 GW 240-43355-12 UG/L
1,1,1,2-TETRACHLOROETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,1,1-TRICHLOROETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,1,2,2-TETRACHLOROETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,1,2-TRICHLOROETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,1-DICHLOROETHANE	--	< 1 U	< 1 U	< 1 U	6.1 J	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	2.4	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,1-DICHLOROETHENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,2,3-TRICHLOROPROPANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U *	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,2-DIBROMO-3-CHLOROPROPANE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
1,2-DICHLOROETHANE	13,000	< 1 U	< 1 U	< 1 U	240	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	6.7 J	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,2-DICHLOROETHENE, TOTAL	--	< 2 U	< 2 U	< 2 U	600	31 J	3.3 J	< 2 U	< 2 U	< 2 U	1.4 J	< 2 U	1.7 J	7.6 J	5.9 J	< 20 U	< 2 U	< 2 U	< 2 U
1,2-DICHLOROPROPANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
1,4-DIOXANE	1,000,000	< 50 U	< 50 U	< 50 U	1600	7000	450	59	< 50 U	100	610	71	< 50 U	7400	5800	2100 j	99	95	< 50 U
2-BUTANONE	--	< 10 U	< 10 U	< 10 U	< 170 U	< 400 U	< 33 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 100 U	< 100 U	< 100 U	< 10 U	< 10 U	< 10 U
2-HEXANONE	--	< 10 U	< 10 U	< 10 U	< 170 U	< 400 U	< 33 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 100 U	< 100 U	< 100 U	< 10 U	< 10 U	< 10 U
3-CHLORO-1-PROPENE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
4-METHYL-2-PENTANONE (MIBK)	--	< 10 U	< 10 U	< 10 U	< 170 U	< 400 U	< 33 U *	< 10 U *	< 10 U *	< 10 U *	< 10 U *	< 10 U *	< 10 U	< 100 U	< 100 U	< 100 U	< 10 U	< 10 U	< 10 U
ACETONE	--	< 10 U	< 10 U	< 10 U	< 170 U	< 400 U	100 B *u	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 100 U	< 100 U	< 100 U	< 10 U	< 10 U	< 10 U
ACETONITRILE	--	< 20 U	< 20 U	< 20 U	< 330 U	< 800 U	< 67 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 200 U	< 200 U	< 200 U	< 20 U	< 20 U	< 20 U
ACROLEIN	--	< 20 U	< 20 U	< 20 U	< 330 U	< 800 U	< 67 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 200 U	< 200 U	< 200 U	< 20 U	< 20 U	< 20 U
ACRYLONITRILE	--	< 20 U	< 20 U	< 20 U	< 330 U	< 800 U	< 67 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 200 U	< 200 U	< 200 U	< 20 U	< 20 U	< 20 U
BENZENE	2,000	< 1 U	< 1 U	< 1 U	6 J	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	5.5 J	3.8 J	< 10 U	< 1 U	< 1 U	< 1 U
BROMODICHLOROMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
BROMOFORM	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
BROMOMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CARBON DISULFIDE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	0.55 J	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CARBON TETRACHLORIDE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CHLOROBENZENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	0.22 J	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CHLOROETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CHLOROFORM	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CHLOROMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
CHLOROPRENE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
CIS-1,2-DICHLOROETHENE	9,400	< 1 U	< 1 U	< 1 U	530	31 J	3.3	< 1 U	< 1 U	< 1 U	1.4	< 1 U	1.7	7.6 J	5.9 J	< 10 U	< 1 U	< 1 U	< 1 U
CIS-1,3-DICHLOROPROPENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U *	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
DIBROMOCHLOROMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
DIBROMOMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
DICHLORODIFLUOROMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
ETHYL METHACRYLATE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
ETHYLBENZENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
ETHYLENE DIBROMIDE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
IODOMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
ISOBUTANOL	--	< 50 U	< 50 U	< 50 U	< 830 U	< 2000 U	< 170 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 500 U	< 500 U	< 500 U	< 50 U	< 50 U	< 50 U
METHACRYLONITRILE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
METHYL METHACRYLATE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
METHYLENE CHLORIDE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	8.5 J Bu	7.5 J Bu	< 10 U	< 1 U	< 1 U	< 1 U
PROPIONITRILE	--	< 4 U	< 4 U	< 4 U	< 67 U	< 160 U	< 13 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 40 U	< 40 U	< 40 U	< 4 U	< 4 U	< 4 U
STYRENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TETRACHLOROETHENE	280	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TOLUENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TRANS-1,2-DICHLOROETHENE	--	< 1 U	< 1 U	< 1 U	68	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TRANS-1,3-DICHLOROPROPENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TRANS-1,4-DICHLORO-2-BUTENE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TRICHLOROETHENE	3,500	< 1 U	< 1 U	< 1 U	6.5 J	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
TRICHLOROFLUOROMETHANE	--	< 1 U	< 1 U	< 1 U	< 17 U	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
VINYL ACETATE	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U
VINYL CHLORIDE	1,250	< 1 U	< 1 U	< 1 U	170	< 40 U	< 3.3 U	< 1 U	< 1 U	< 1 U	0.36 J	< 1 U	1.8	< 10 U	< 10 U	< 10 U	< 1 U	< 1 U	< 1 U
XYLENES, TOTAL	--	< 2 U	< 2 U	< 2 U	< 33 U	< 80 U	< 6.7 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 20 U	< 20 U	< 20 U	< 2 U	< 2 U	< 2 U

See data validation memo for definitions of data qualifiers.
VOCs = Volatile Organic Compounds
GW = Ground Water
DUP = Duplicate Sample
RE = Laboratory Reanalyzed Sample
µg/L = micrograms per liter

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

TABLE 2: Surface Water VOC Results (October 2014)

ANALYTE	DC INFLOW 10/20/2014 SW 240-43355-1 UG/L	DC OUTFLOW 10/20/2014 SW 240-43355-2 UG/L
1,1,1,2-TETRACHLOROETHANE	< 1 U	< 1 U
1,1,1-TRICHLOROETHANE	< 1 U	< 1 U
1,1,2,2-TETRACHLOROETHANE	< 1 U	< 1 U
1,1,2-TRICHLOROETHANE	< 1 U	< 1 U
1,1-DICHLOROETHANE	< 1 U	< 1 U
1,1-DICHLOROETHENE	< 1 U	< 1 U
1,2,3-TRICHLOROPROPANE	< 1 U	< 1 U
1,2-DIBROMO-3-CHLOROPROPANE	< 2 U	< 2 U
1,2-DICHLOROETHANE	< 1 U	< 1 U
1,2-DICHLOROETHENE, TOTAL	< 2 U	< 2 U
1,2-DICHLOROPROPANE	< 1 U	< 1 U
1,4-DIOXANE	< 50 U	< 50 U
2-BUTANONE	< 10 U	< 10 U
2-HEXANONE	< 10 U	< 10 U
3-CHLORO-1-PROPENE	< 2 U	< 2 U
4-METHYL-2-PENTANONE (MIBK)	< 10 U	< 10 U
ACETONE	< 10 U	< 10 U
ACETONITRILE	< 20 U	< 20 U
ACROLEIN	< 20 U	< 20 U
ACRYLONITRILE	< 20 U	< 20 U
BENZENE	< 1 U	< 1 U
BROMODICHLOROMETHANE	< 1 U	< 1 U
BROMOFORM	< 1 U	< 1 U
BROMOMETHANE	< 1 U	< 1 U
CARBON DISULFIDE	< 1 U	< 1 U
CARBON TETRACHLORIDE	< 1 U	< 1 U
CHLOROBENZENE	< 1 U	< 1 U
CHLOROETHANE	< 1 U	< 1 U
CHLOROFORM	< 1 U	< 1 U
CHLOROMETHANE	< 1 U	< 1 U
CHLOROPRENE	< 2 U	< 2 U

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

TABLE 2: Surface Water VOC Results (October 2014)

ANALYTE	DC INFLOW 10/20/2014 SW 240-43355-1 UG/L	DC OUTFLOW 10/20/2014 SW 240-43355-2 UG/L
CIS-1,2-DICHLOROETHENE	< 1 U	< 1 U
CIS-1,3-DICHLOROPROPENE	< 1 U	< 1 U
DIBROMOCHLOROMETHANE	< 1 U	< 1 U
DIBROMOMETHANE	< 1 U	< 1 U
DICHLORODIFLUOROMETHANE	< 1 U	< 1 U
ETHYL METHACRYLATE	< 1 U	< 1 U
ETHYLBENZENE	< 1 U	< 1 U
ETHYLENE DIBROMIDE	< 1 U	< 1 U
IODOMETHANE	< 1 U	< 1 U
ISOBUTANOL	< 50 U	< 50 U
METHACRYLONITRILE	< 2 U	< 2 U
METHYL METHACRYLATE	< 2 U	< 2 U
METHYLENE CHLORIDE	< 1 U	< 1 U
PROPIONITRILE	< 4 U	< 4 U
STYRENE	< 1 U	< 1 U
TETRACHLOROETHENE	< 1 U	< 1 U
TOLUENE	< 1 U	0.24 J
TRANS-1,2-DICHLOROETHENE	< 1 U	< 1 U
TRANS-1,3-DICHLOROPROPENE	< 1 U	< 1 U
TRANS-1,4-DICHLORO-2-BUTENE	< 1 U	< 1 U
TRICHLOROETHENE	< 1 U	< 1 U
TRICHLOROFLUOROMETHANE	< 1 U	< 1 U
VINYL ACETATE	< 2 U	< 2 U
VINYL CHLORIDE	< 1 U	< 1 U
XYLENES, TOTAL	< 2 U	< 2 U

See data validation memo for definitions of data qualifiers.

VOCs = Volatile Organic Compounds

SW = Surface Water

RE = Laboratory Reanalyzed Sample

µg/L = micrograms per liter

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 218083.0000

TABLE 3: Aqueous Quality Control VOC Results (October 2014)

ANALYTE	FIELD BLANK 10/21/2014 QFB 240-43355-8 UG/L	FIELD BLANK 10/22/2014 QFB 240-43416-2 UG/L	RINSEATE 10/22/2014 QRIN 240-43416-3 UG/L	TRIP BLANK 10/20/2014 QTB 240-43355-7 UG/L	TRIP BLANK 10/22/2014 QTB 240-43416-5 UG/L	TRIP BLANK 10/23/2014 QTB 240-43473-7 UG/L
1,1,1,2-TETRACHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-TRICHLOROETHANE	< 1 U	< 1 U *	< 1 U *	< 1 U	< 1 U	< 1 U
1,1,2,2-TETRACHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-TRICHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-DICHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-DICHLOROETHENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-TRICHLOROPROPANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-DIBROMO-3-CHLOROPROPANE	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
1,2-DICHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-DICHLOROETHENE, TOTAL	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
1,2-DICHLOROPROPANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-DIOXANE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
2-BUTANONE	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-HEXANONE	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
3-CHLORO-1-PROPENE	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
4-METHYL-2-PENTANONE (MIBK)	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
ACETONE	< 10 U	< 10 U	< 10 U	< 10 U	4.5 J	4.6 J
ACETONITRILE	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
ACROLEIN	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
ACRYLONITRILE	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
BENZENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
BROMODICHLOROMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
BROMOFORM	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
BROMOMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CARBON DISULFIDE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CARBON TETRACHLORIDE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CHLOROBENZENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CHLOROETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CHLOROFORM	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CHLOROMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CHLOROPRENE	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
CIS-1,2-DICHLOROETHENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
CIS-1,3-DICHLOROPROPENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
DIBROMOCHLOROMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
DIBROMOMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
DICHLORODIFLUOROMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
ETHYL METHACRYLATE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
ETHYLBENZENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
ETHYLENE DIBROMIDE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
IODOMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
ISOBUTANOL	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
METHACRYLONITRILE	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 218083.0000

TABLE 3: Aqueous Quality Control VOC Results (October 2014)

ANALYTE	FIELD BLANK 10/21/2014 QFB 240-43355-8 UG/L	FIELD BLANK 10/22/2014 QFB 240-43416-2 UG/L	RINSEATE 10/22/2014 QRIN 240-43416-3 UG/L	TRIP BLANK 10/20/2014 QTB 240-43355-7 UG/L	TRIP BLANK 10/22/2014 QTB 240-43416-5 UG/L	TRIP BLANK 10/23/2014 QTB 240-43473-7 UG/L
METHYL METHACRYLATE	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
METHYLENE CHLORIDE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
PROPIONITRILE	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
STYRENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TETRACHLOROETHENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TOLUENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TRANS-1,2-DICHLOROETHENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TRANS-1,3-DICHLOROPROPENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TRANS-1,4-DICHLORO-2-BUTENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TRICHLOROETHENE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
TRICHLOROFLUOROMETHANE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
VINYL ACETATE	< 2 U	< 2 U *	< 2 U *	< 2 U	< 2 U	< 2 U
VINYL CHLORIDE	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
XYLENES, TOTAL	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

See data validation memo for definitions of data qualifiers.
VOCs = Volatile Organic Compounds
QFB = Field Blank
QRIN = Equipment Rinseate
QTB = Trip Blank
µg/L = micrograms per liter

TRC Environmental Corporation

EMD Chemicals Inc.
Norwood, Ohio
Project No. 213083.03

TABLE 4: Performance Monitoring Well Ground Water Elevations, 10/20/2014

B0=Fill; C0=Upper Till Unit; C1=Upper Till Sand Seams; D1=Upper Sand Unit; D2=Lacustrine Unit; D3=Lower Clay Unit; D4=Lower Sand Zone; D5=Lacustrine 2 Zone; E1=Lacustrine 3 Zone
PVC=Poly Vinyl Chloride; SS=Stainless Steel; Iron=Iron Pipe; NL=Not Listed
fbtoc=feet below top of casing; famsl=feet above mean sea level; DCBC=Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) surveyed by G.J. Berding Surveying, Inc., 2004/2005.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened	2014 Baseline Ground Water Elevation Ranges (famsl)	
DW001	1419787.08	430079.00	582.50	9.04	573.46	30.46	2.00	PVC	D3-Middle	Max	573.49
										Min	571.47
DW002	1419985.28	430108.94	578.44	12.18	566.26	27.83	2.00	PVC	D3-Middle	Max	566.48
										Min	563.96
DW003	1420054.60	430125.89	577.10	10.32	566.78	29.33	2.00	PVC	D3-Middle	Max	566.86
										Min	564.24
DW004	1420078.14	430128.17	576.79	20.68	556.11	42.44	2.00	PVC	D3-Lower	Max	557.00
										Min	542.86
MW004	1419890.20	430376.76	609.85	3.70	606.15	11.75	2.00	SS	B0	Max	--
										Min	--
MW006	1419951.30	430284.88	608.39	12.01	596.38	16.19	2.00	SS	B0	Max	--
										Min	--
MW011	1419451.70	430726.56	617.18	7.54	609.64	20.58	2.00	SS	C1	Max	--
										Min	--
MW011A	1419456.70	430726.09	618.64	35.44	583.20	40.14	0.75	Iron	D1	Max	585.45
										Min	582.42
MW011C	1419470.90	430724.79	616.17	31.77	584.40	51.47	2.00	SS	D3-Upper	Max	--
										Min	--
MW012	1419879.40	430305.53	609.03	17.71	591.32	24.93	2.00	SS	B0	Max	--
										Min	--
MW013	1420051.30	430292.75	610.41	15.45	594.96	22.71	2.00	SS	C1	Max	--
										Min	--
MW014	1420057.80	430400.11	610.39	29.57	580.82	31.19	2.00	SS	D1	Max	--
										Min	--
MW014A	1420055.70	430396.89	611.16	11.06	600.10	15.96	0.75	Iron	C1	Max	--
										Min	--
MW016	1420181.30	430466.79	596.59	27.98	568.61	36.99	2.00	SS	D1	Max	568.90
										Min	568.41
MW021A	1419776.50	430664.08	611.20	29.12	582.08	33.63	2.00	SS	D1	Max	595.36
										Min	581.10
MW021B	1419774.00	430664.23	611.17	15.27	595.90	21.88	2.00	SS	C1	Max	--
										Min	--
MW025	1419991.30	430667.55	606.19	9.51	596.68	20.85	2.00	SS	C1	Max	597.30
										Min	595.60
MW025A	1419940.50	430670.88	607.98	26.98	581.00	41.98	2.00	SS	D1	Max	--
										Min	--
MW027	1419776.90	430157.16	610.18	10.81	599.37	21.28	2.00	SS	C1	Max	--
										Min	--
MW029	1420099.80	430635.41	602.99	24.93	578.06	33.29	2.00	SS	D1	Max	--
										Min	--
MW030	1420070.00	430570.20	608.48	35.36	573.12	72.50	2.00	SS	D3-Middle	Max	583.26
										Min	572.68
MW031A	1419906.70	430519.78	610.45	20.58	589.87	35.25	2.00	SS	D1	Max	591.68
										Min	587.24
MW031B	1419902.20	430520.02	610.43	15.09	595.34	25.03	2.00	SS	C1	Max	596.25
										Min	593.83
MW031C	1419898.50	430517.80	609.95	31.32	578.63	51.30	2.00	SS	D2-Lower	Max	580.44
										Min	577.86
MW031D	1419903.10	430516.72	609.91	32.23	577.68	61.90	2.00	SS	D3-Upper	Max	579.29
										Min	577.16
MW035	1419879.20	430445.33	608.96	27.19	581.77	32.46	2.00	SS	D1	Max	--
										Min	--
MW035A	1419884.60	430441.64	609.00	27.04	581.96	34.00	4.00	PVC	D1	Max	--
										Min	--
MW041	1420279.20	430603.59	595.04	28.97	566.07	55.34	2.00	SS	D2-Lower	Max	566.65
										Min	565.96
MW044	1420308.50	430661.26	594.73	27.38	567.35	56.03	2.00	SS	D3-Lower	Max	567.52
										Min	566.58
MW051A	1419710.70	430138.92	609.31	17.78	591.53	22.21	2.00	SS	C1	Max	--
										Min	--
MW301	1419617.80	430609.13	612.43	Paved Over	--	23.50	2.00	SS	C1	Max	--
										Min	--
MW505A	1420182.20	430051.41	571.78	4.62	567.16	13.60	2.00	SS	D2-Middle	Max	567.78
										Min	567.16
MW505B	1420183.50	430050.20	571.70	7.03	564.67	21.38	2.00	SS	D2-Lower	Max	565.49
										Min	564.54
MW506	1420382.30	430221.60	566.76	13.22	553.54	14.05	2.00	SS	Sewer Backfill	Max	--
										Min	--

TRC Environmental Corporation

EMD Chemicals Inc.
Norwood, Ohio
Project No. 213083.03

TABLE 4: Performance Monitoring Well Ground Water Elevations, 10/20/2014

B0=Fill; C0=Upper Till Unit; C1=Upper Till Sand Seams; D1=Upper Sand Unit; D2=Lacustrine Unit; D3=Lower Clay Unit; D4=Lower Sand Zone; D5=Lacustrine 2 Zone; E1=Lacustrine 3 Zone
PVC=Poly Vinyl Chloride; SS=Stainless Steel; Iron=Iron Pipe; NL=Not Listed
fbtoc=feet below top of casing; famsl=feet above mean sea level; DCBC=Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) surveyed by G.J. Berding Surveying, Inc., 2004/2005.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened	2014 Baseline Ground Water Elevation Ranges (famsl)	
MW507	1420388.10	430000.81	568.67	12.76	555.91	19.30	2.00	SS	D2-Lower	Max	--
										Min	--
MW507B	1420395.58	429994.67	569.35	14.92	554.43	27.08	2.00	PVC	D3-Lower	Max	--
										Min	--
MW508	1420141.80	429909.99	590.51	34.09	556.42	36.49	2.00	SS	B0-Lower	Max	557.16
										Min	556.42
MW508B	1420159.30	429904.31	590.35	34.28	556.07	50.12	2.00	PVC	D3-Lower	Max	556.07
										Min	548.18
MW509A	1420557.33	429973.21	566.09	9.42	556.67	18.71	2.00	PVC	B0-Lower	Max	558.04
										Min	556.67
MW509B	1420550.88	429971.94	566.07	11.35	554.72	26.45	2.00	PVC	D3-Lower	Max	566.07
										Min	550.01
MW510A	1420487.41	429873.49	569.66	14.79	554.87	15.75	2.00	PVC	B0-Lower	Max	555.21
										Min	554.87
MW510B	1420482.86	429877.57	570.01	23.30	546.71	29.21	2.00	PVC	D3-Lower	Max	546.86
										Min	545.49
P001	1420161.30	430368.72	599.77	23.72	576.05	30.67	2.00	SS	D1	Max	--
										Min	--
P005	1419770.40	430155.51	610.81	30.26	580.55	30.51	2.00	SS	D1	Max	--
										Min	--
P006	1420188.70	430551.39	595.52	28.08	567.44	54.00	2.00	SS	D3-Middle	Max	567.44
										Min	566.86
P006A	1420194.80	430550.52	592.40	28.78	563.62	53.20	4.00	PVC	D3-Middle	Max	--
										Min	--
P007	1420187.30	430572.84	594.95	I/A	--	48.85	2.00	PVC	D3-Middle	Max	--
										Min	--
P008	1420190.70	430518.84	595.80	I/A	--	49.30	2.00	PVC	D3-Middle	Max	--
										Min	--
P009	1420192.10	430496.79	596.64	28.37	568.27	52.04	2.00	PVC	D3-Middle	Max	--
										Min	--
WRPZ05	1419873.72	430096.79	579.85	1.45	578.40	5.06	1.00	PVC	B0-Lower	Max	579.35
										Min	576.31
WRPZ10	1419879.15	430096.96	579.67	1.93	577.74	9.95	1.00	PVC	D2-Middle	Max	578.97
										Min	576.11
WRPZ15	1419884.16	430098.11	579.45	5.50	573.95	14.80	1.00	PVC	D2-Middle	Max	574.48
										Min	572.42
WRPZ20	1419888.47	430098.89	579.39	6.35	573.04	19.50	1.00	PVC	D2-Lower	Max	--
										Min	--
VE535/12-17	--	--	--	Dry	--	17.00	1.00	PVC	B0-Lower	Max	--
										Min	--
VE539/06-11	1420086.44	430133.81	576.68	4.73	571.95	11.00	1.00	PVC	B0-Lower	Max	--
										Min	--
VE542/04.5-09.5	1420008.24	430113.43	578.31	4.37	573.94	9.50	1.00	PVC	D2-Upper	Max	575.62
										Min	573.36
VE542/11.5-16.5	1420006.04	430112.95	578.29	10.89	567.40	16.50	1.00	PVC	D2-Lower	Max	572.59
										Min	567.07
VE543/14-19	--	--	--	Dry	--	16.50	1.00	PVC	--	Max	--
										Min	--
MW26AR	1419640.73	430489.15	610.61	29.53	581.08	59.70	2.00	PVC	D1	Max	582.62
										Min	579.42
MW26R	1419640.02	430482.06	610.75	29.21	581.54	41.97	2.00	PVC	D3-Middle	Max	583.98
										Min	580.28
MW01R	1419625.69	430268.36	608.24	12.41	595.83	33.25	2.00	PVC	C1	Max	603.89
										Min	592.94
MW01AR	1419615.57	430270.15	608.20	27.91	580.29	31.63	2.00	PVC	C1	Max	--
										Min	--
PZ-3AR	1419812.72	430177.14	606.89	27.78	579.11	31.63	2.00	PVC	--	Max	--
										Min	--
PZ-3BR	1419812.48	430178.55	606.98	32.47	574.51	48.30	2.00	PVC	--	Max	--
										Min	--
MW15BR	1420167.97	430288.20	600.53	32.03	568.50	54.45	2.00	PVC	D3-Upper	Max	568.66
										Min	566.39
MW15R	1420165.41	430285.65	600.58	24.56	576.02	28.60	2.00	PVC	D1	Max	579.04
										Min	575.85
MW23R	--	--	597.30	37.23	560.07	38.98	2.00	PVC	Sewer Backfill	Max	--
										Min	--
MW18R	--	--	597.23	36.58	560.65	--	2.00	PVC	Sewer Backfill	Max	--
										Min	--
MW43AR	--	--	597.43	34.55	562.88	52.20	2.00	PVC	D5	Max	562.99
										Min	560.79

EMD Millipore Corporation
Norwood, Ohio
Project No. 213083.0003

TABLE 5: Groundwater Intercept Trench Water Levels

Shaft #			Groundwater Intercept Trench Water Levels							
Top PVC Elev										
Feet (asl) Shaft #										
Top PVC Elev										
Feet (asl)	Well Number	Cover	4/1/2014	4/28/2014	5/8/2014	6/26/2014	7/3/2014	8/12/2014	10/2/2014	Trench Bottom
TMW	2	606.482	571.822	568.482	569.982	569.482	571.232	569.982	566.822	550.000
TMW	4	606.475	571.815	568.482	569.982	569.732	571.232	569.982	566.822	550.000
TMW	6	606.409	571.749	568.482	569.982	569.732	571.482	569.982	566.822	550.000
TMW	8	606.418	571.758	568.482	569.982	569.732	571.482	569.982	566.822	550.000
TMW	10	606.344	571.844	568.732	569.982	569.732	571.482	569.982	566.982	550.000
TMW	12	606.274	571.774	568.732	570.152	569.822	571.732	570.152	566.982	550.000
TMW	14	606.143	571.643	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	16	606.179	571.679	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	18	606.154	571.654	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	20	606.125	571.625	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	22	606.089	571.589	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	24	606.074	571.574	568.982	570.152	569.982	571.732	570.232	567.152	550.000
TMW	26	606.059	571.559	568.982	569.482	569.982	570.482	569.982	566.982	550.000
TMW	28	606.061	570.401	568.482	569.482	569.232	570.482	569.982	566.982	550.000
TMW	30	606.040	570.040	568.232	569.232	569.232	570.232	569.982	566.982	550.000
TMW	32	606.079	569.829	568.232	569.232	569.152	570.232	569.982	566.982	550.000
TMW	34	606.081	569.831	568.232	569.232	569.152	570.232	569.982	566.982	550.000
TMW	36	606.097	569.847	568.232	569.232	569.152	570.082	569.982	566.982	550.000
TMW	38	606.115	569.615	568.152	569.232	568.982	570.082	569.982	566.982	550.000
TMW	40	606.129	569.629	568.152	568.982	568.982	570.082	569.982	566.982	550.000
TMW	42	606.174	569.674	567.822	568.982	568.822	569.822	569.982	566.712	550.000
TMW	44	606.388	569.888	567.822	568.982	568.732	569.982	569.732	566.712	550.000
TMW	46	606.240	569.740	567.982	568.822	568.482	569.732	569.732	566.732	550.000
TMW	48	606.498	569.748	567.982	568.822	568.152	569.732	569.482	566.482	550.000
TMW	50	606.543	569.793	567.822	568.152	567.822	568.982	569.482	566.482	550.000
TMW	52	606.625	569.295	567.482	567.822	567.482	568.732	569.152	566.482	550.000
TMW	54	606.631	568.881	567.152	567.732	567.482	568.482	568.982	566.232	550.000
TMW	56	606.661	568.661	566.982	567.482	567.232	568.232	568.982	566.232	550.000
TMW	58	606.629	568.629	566.982	567.232	566.482	568.152	568.982	566.232	550.000
TMW	60	606.664	568.334	566.822	565.732	562.482	566.982	568.732	566.232	550.000
TMW	62	606.718	567.218	564.152	563.182	562.482	563.152	566.982	560.482	550.000
TMW	64	606.721	564.221	561.482	563.182	562.232	563.152	561.232	559.482	550.000
TMW	66	606.731	564.231	561.482	562.982	562.232	562.982	561.232	559.482	550.000
TMW	68	606.695	564.035	561.232	562.982	562.232	562.982	561.152	559.482	550.000
TMW	70	606.798	564.138	561.232	562.982	562.232	562.982	561.152	559.482	550.000
TMW	72	606.728	563.978	561.232	562.982	561.822	562.982	561.152	559.482	550.000
TMW	74	606.721	563.221	561.232	562.482	561.822	562.232	561.152	559.232	550.000
TMW	76	606.761	563.261	560.982	562.232	561.822	562.232	560.822	559.232	550.000
TMW	78	606.852	563.352	560.822	562.232	561.822	562.232	560.822	559.232	550.000
TMW	80	606.907	563.577	560.822	562.232	561.732	562.232	560.732	559.232	550.000
TMW	82	606.899	563.569	560.822	562.232	561.482	562.152	560.732	559.152	550.000
TMW	84	606.935	563.185	560.732	562.152	559.982	561.982	560.482	559.152	550.000
TMW	86	606.971	563.221	560.732	560.482	559.982	560.152	559.232	558.982	550.000
TMW	88	606.986	560.736	559.152	559.822	559.822	560.152	559.232	557.732	550.000
TMW	90	606.996	560.746	559.152	559.822	559.822	560.152	559.232	557.732	550.000
TMW	92	607.033	560.783	558.982	559.822	559.822	559.982	559.232	557.732	550.000
TMW	94	607.065	560.735	558.982	559.822	559.822	559.982	559.152	557.482	550.000
TMW	96	607.077	560.747	558.982	559.822	559.482	559.982	559.152	557.482	550.000
TMW	98	607.096	560.766	558.982	559.482	559.482	559.822	558.982	557.482	550.000
TMW	100	607.106	560.446	558.982	559.482	558.232	559.822	558.982	557.482	550.000
TMW	102	607.106	560.446	558.822	557.732	561.232	558.482	557.822	557.482	550.000
TMW	104	607.141	558.891	558.822	557.732	558.232	558.232	557.732	556.982	550.000
TMW	106	607.158	558.908	558.732	557.732	558.232	558.232	557.732	556.982	550.000
TMW	108	607.176	558.926	558.732	557.482	557.482	558.232	557.482	556.882	550.000
TMW	110	607.199	558.799	558.732	557.482	557.482	557.482	557.482	556.882	550.000
TMW	112	607.241	551.741	550.482	550.732	550.732	550.732	550.982	550.482	550.000
TMW	114	607.287	552.287	550.982	550.982	550.982	550.482	550.482	550.482	550.000
SUMP	Sump	608.000	553.000	550.482	550.482	550.482	550.482	550.482	550.482	550.000
TMW	120	607.020	551.520	550.482	550.482	550.482	550.482	550.482	550.482	550.000
TMW	122	606.790	551.290	550.482	550.482	550.982	550.822	551.152	550.732	550.000
TMW	124	606.620	552.620	552.482	552.482	552.232	552.232	552.482	552.482	550.000
TMW	126	606.460	552.710	552.732	552.732	552.482	552.482	552.482	552.732	550.000

EMD Millipore Corporation
Norwood, Ohio
Project No. 213083.0003

TABLE 5: Groundwater Intercept Trench Water Levels

Shaft #			Groundwater Intercept Trench Water Levels							
Top PVC Elev										
Feet (asl) Shaft #										
Top PVC Elev										
Feet (asl)	Well Number	Cover	4/1/2014	4/28/2014	5/8/2014	6/26/2014	7/3/2014	8/12/2014	10/2/2014	Trench Bottom
TMW	128	606.260	552.600	552.822	552.822	552.682	552.822	552.822	552.822	550.000
TMW	130	606.130	552.630	552.982	552.982	552.982	552.822	552.982	552.982	550.000
TMW	132	606.000	552.500	552.982	552.982	552.982	552.982	552.982	553.232	550.000
TMW	134	605.860	552.610	553.232	553.232	553.232	553.152	553.232	553.232	550.000
TMW	136	605.730	558.730	559.482	559.482	559.482	559.482	559.482	559.482	550.000
TMW	138	605.610	558.950	559.732	559.732	559.822	559.822	559.732	559.732	550.000
TMW	140	605.500	558.840	559.822	559.822	559.822	559.822	559.822	559.822	550.000
TMW	142	605.340	558.840	559.982	559.982	559.982	559.982	559.982	559.982	550.000
TMW	144	605.210	558.880	559.982	559.982	560.152	559.982	559.982	559.982	550.000
TMW	146	605.050	558.800	560.232	560.232	560.232	560.232	560.232	560.152	550.000
TMW	148	604.890	559.890	561.482	561.482	561.482	561.482	561.482	561.482	550.000
TMW	150	604.750	560.250	561.732	561.732	561.732	561.732	561.732	561.732	550.000

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

TABLE 6: Effluent Monitoring Results

ANALYTE	WW EFFLUENT 11/25/2014 GW 240-44867-1 UG/L	WW EFFLUENT 11/25/2014 GWRE 240-44867-1 UG/L	WW EFFLUENT 12/18/2014 GW 240-45751-1 UG/L
1,1,1,2-TETRACHLOROETHANE	< 1 U r	< 1 U	< 2.5 U
1,1,1-TRICHLOROETHANE	3.4 r	3.7	6.6
1,1,2,2-TETRACHLOROETHANE	5.6 r	5.1	6.3
1,1,2-TRICHLOROETHANE	1.7 r	1.8	2.3 J
1,1-DICHLOROETHANE	24 r	28	37
1,1-DICHLOROETHENE	< 1 U r	< 1 U	< 2.5 U
1,2,3-TRICHLOROPROPANE	< 1 U r	< 1 U	< 2.5 U
1,2-DIBROMO-3-CHLOROPROPANE	< 2 U r	< 2 U	< 5 U
1,2-DICHLOROETHANE	11 r	13	72
1,2-DICHLOROETHENE, TOTAL	< 2 U r	0.6 J	< 5 U
1,2-DICHLOROPROPANE	< 1 U r	< 1 U	< 2.5 U
1,4-DIOXANE	160 r	190	270
2-BUTANONE	120 E r	< 10 U	< 25 U
2-HEXANONE	< 10 U r	< 10 U	< 25 U
3-CHLORO-1-PROPENE	< 2 U r	< 2 U	< 5 U
4-METHYL-2-PENTANONE (MIBK)	< 10 U r	< 10 U	< 25 U
ACETONE	960 E r	31	34
ACETONITRILE	< 20 U r	< 20 U	< 50 U
ACROLEIN	< 20 U r	< 20 U *	< 50 U
ACRYLONITRILE	< 20 U r	< 20 U	< 50 U
BENZENE	9.6 r	9.1	3.5
BROMODICHLOROMETHANE	< 1 U r	< 1 U	< 2.5 U
BROMOFORM	1.4 r	1.4	3.6
BROMOMETHANE	< 1 U r	< 1 U	< 2.5 U
CARBON DISULFIDE	< 1 U r	< 1 U	< 2.5 U
CARBON TETRACHLORIDE	0.48 J r	0.47 J	0.53 J
CHLOROBENZENE	< 1 U r	< 1 U	< 2.5 U
CHLOROETHANE	< 1 U r	< 1 U	< 2.5 U
CHLOROFORM	9.4 r	10	25
CHLOROMETHANE	< 1 U r	< 1 U	1.3 J
CHLOROPRENE	< 2 U r	< 2 U	< 5 U
CIS-1,2-DICHLOROETHENE	< 1 U r	0.6 J	< 2.5 U
CIS-1,3-DICHLOROPROPENE	< 1 U r	< 1 U	< 2.5 U

EMD Chemicals Inc.

Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

TABLE 6: Effluent Monitoring Results

ANALYTE	WW EFFLUENT 11/25/2014 GW 240-44867-1 UG/L	WW EFFLUENT 11/25/2014 GWRE 240-44867-1 UG/L	WW EFFLUENT 12/18/2014 GW 240-45751-1 UG/L
DIBROMOCHLOROMETHANE	< 1 U r	< 1 U	< 2.5 U
DIBROMOMETHANE	< 1 U r	< 1 U	< 2.5 U
DICHLORODIFLUOROMETHANE	< 1 U r	< 1 U	< 2.5 U
ETHYL METHACRYLATE	< 1 U r	< 1 U	< 2.5 U
ETHYLBENZENE	0.33 J r	0.28 J	< 2.5 U
ETHYLENE DIBROMIDE	< 1 U r	< 1 U	< 2.5 U
IODOMETHANE	< 1 U r	< 1 U	< 2.5 U
ISOBUTANOL	< 50 U r	< 50 U	< 130 U
METHACRYLONITRILE	< 2 U r	< 2 U	< 5 U
METHYL METHACRYLATE	< 2 U r	< 2 U	< 5 U
METHYLENE CHLORIDE	< 1 U r	< 1 U	< 2.5 U
PROPIONITRILE	< 4 U r	< 4 U	< 10 U
STYRENE	< 1 U r	< 1 U	< 2.5 U
TETRACHLOROETHENE	0.37 J r	0.32 J	0.6 J
TOLUENE	< 1 U r	< 1 U	< 2.5 U
TRANS-1,2-DICHLOROETHENE	< 1 U r	< 1 U	< 2.5 U
TRANS-1,3-DICHLOROPROPENE	< 1 U r	< 1 U	< 2.5 U
TRANS-1,4-DICHLORO-2-BUTENE	< 1 U r	< 1 U	< 2.5 U
TRICHLOROETHENE	0.2 J r	0.24 J	< 2.5 U
TRICHLOROFLUOROMETHANE	< 1 U r	< 1 U	< 2.5 U
VINYL ACETATE	< 2 U r	< 2 U *	< 5 U
VINYL CHLORIDE	< 1 U r	< 1 U	< 2.5 U
XYLENES, TOTAL	< 2 U r	< 2 U	< 5 U

VOCs = Volatile Organic Compounds

GW = Ground Water

RE = Laboratory Reanalyzed Sample

µg/L = micrograms per liter

* = Laboratory Control Sample exceeds the control limits

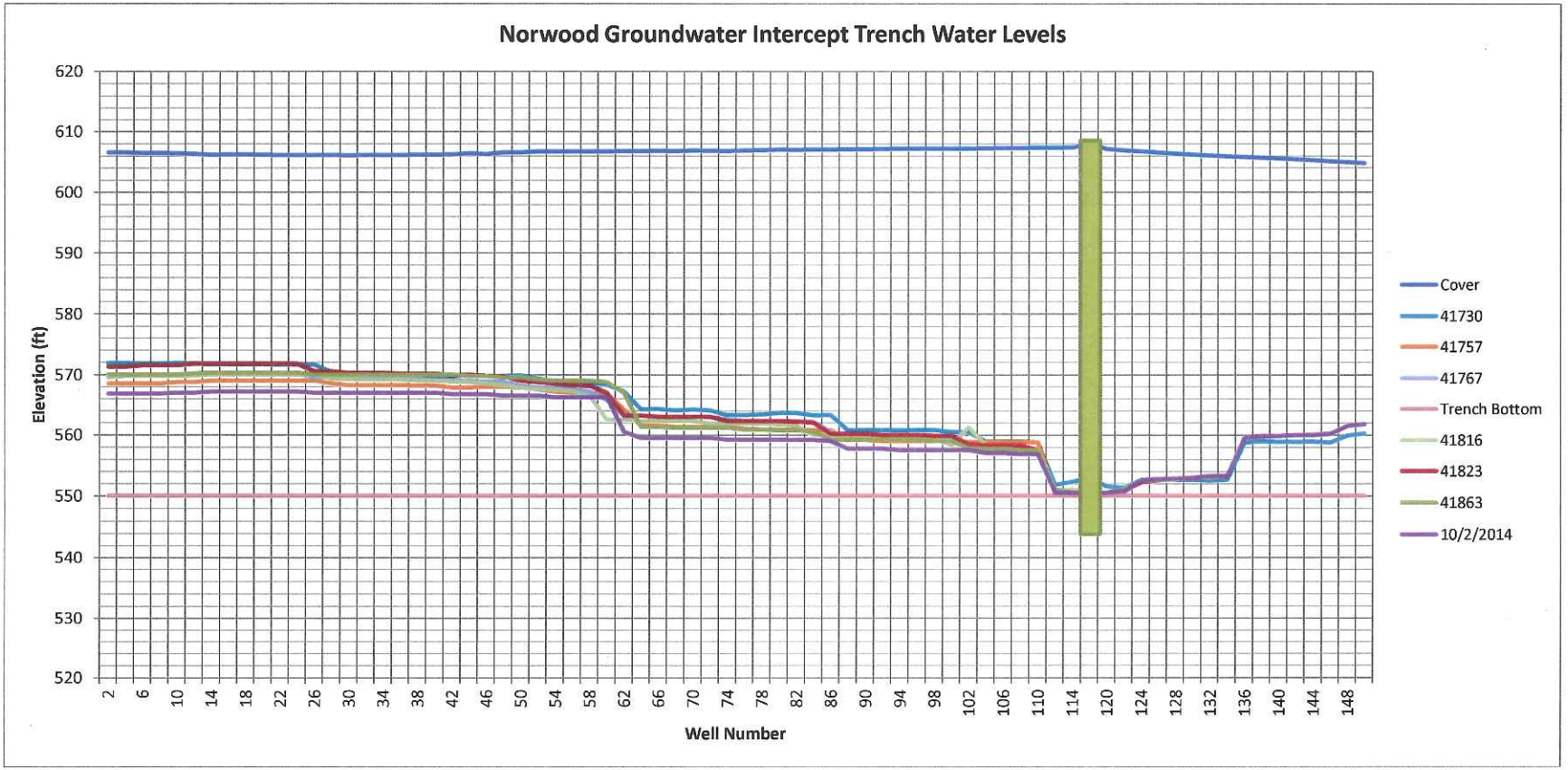
E = Result exceeded calibration range.

r = Data rejected

CHARTS

EMD Millipore Corporation
Norwood, Ohio
Project No. 213083.03

Chart 1: Groundwater Intercept Trench Water Level Chart



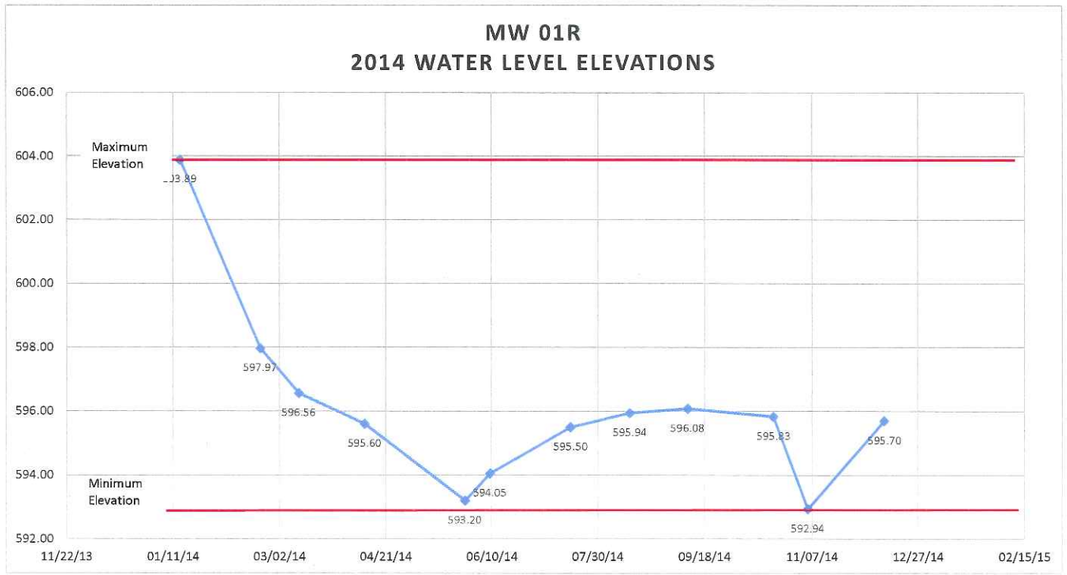
EMD Chemicals Inc.

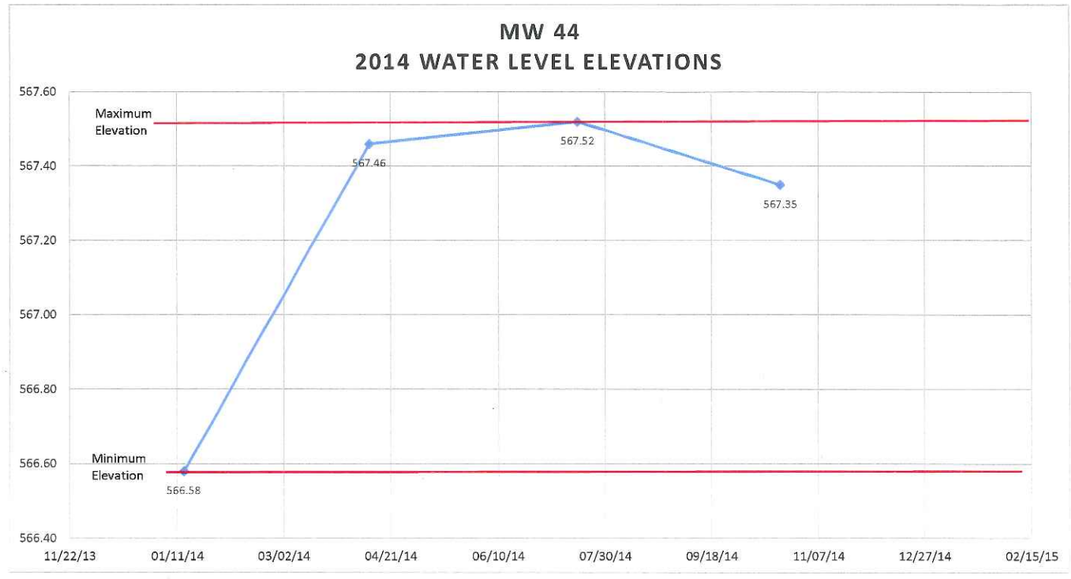
Norwood, Ohio

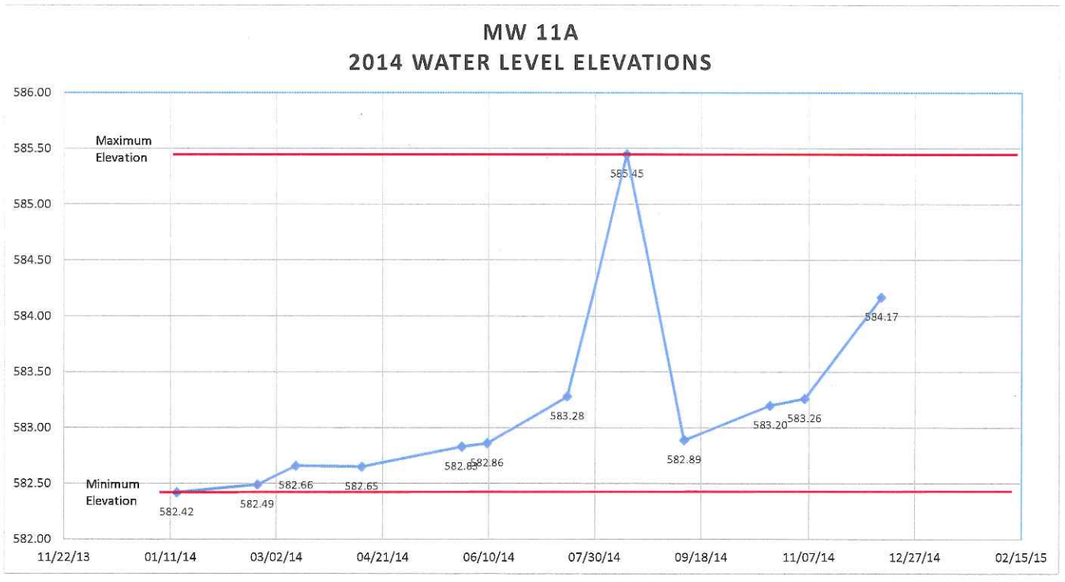
U.S. EPA ID No. OHD086438538

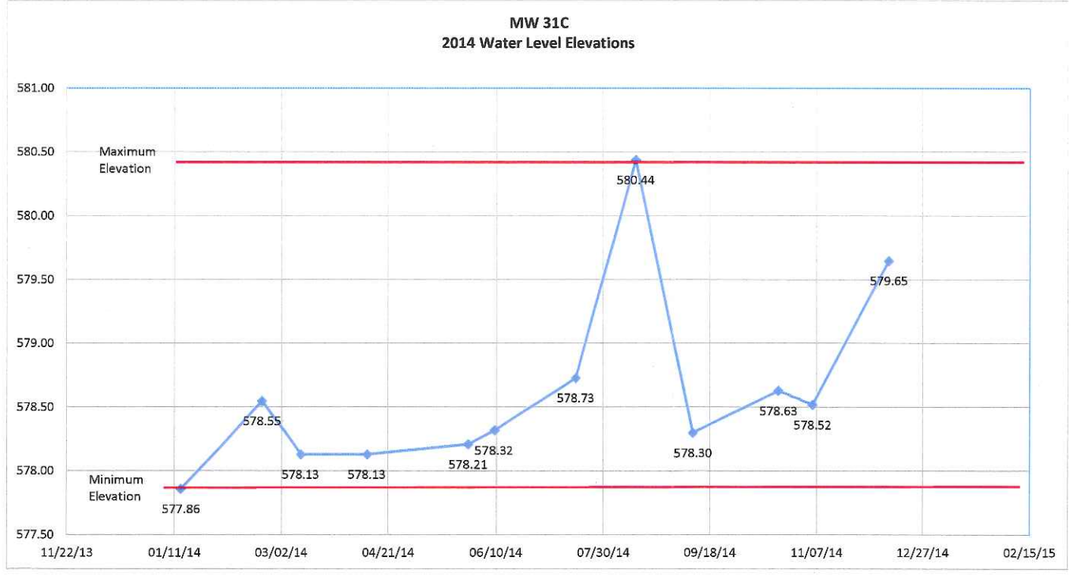
Project No. 213083.0000

Chart 2: On-Site Monitoring Well Locations









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Norwood, Ohio

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Project No. 213083.0000

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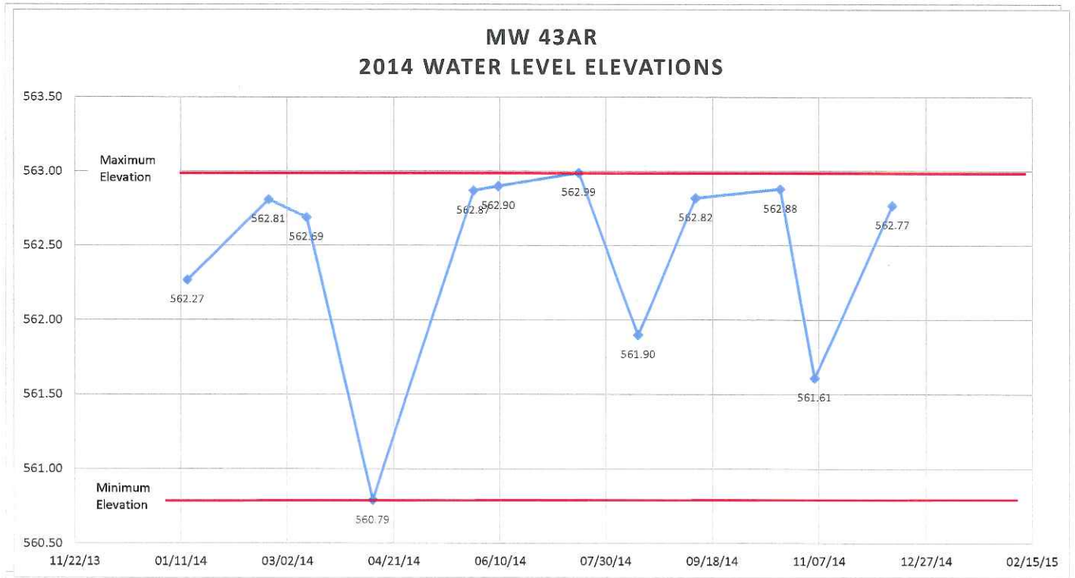
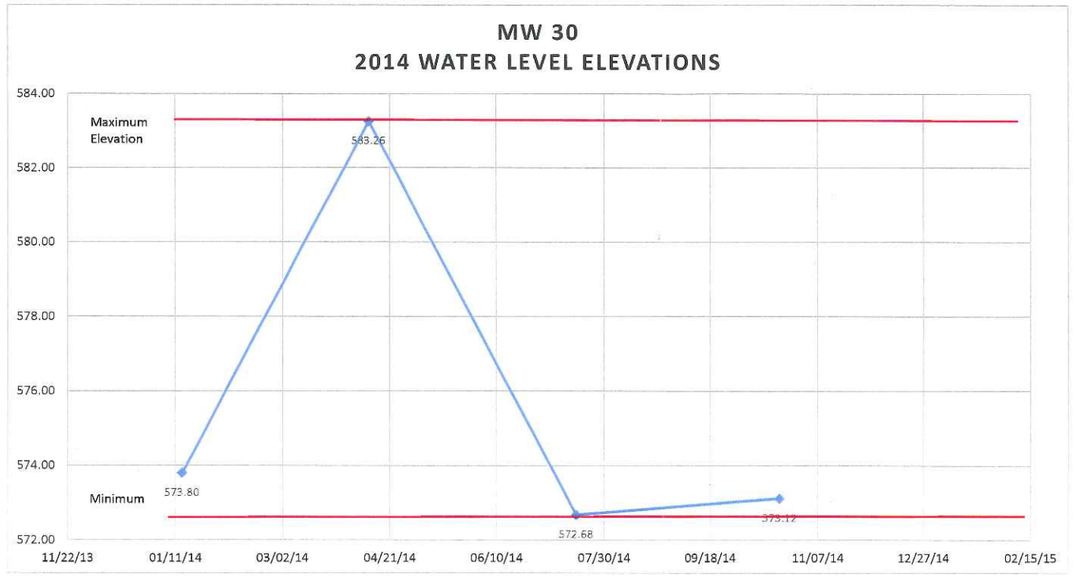
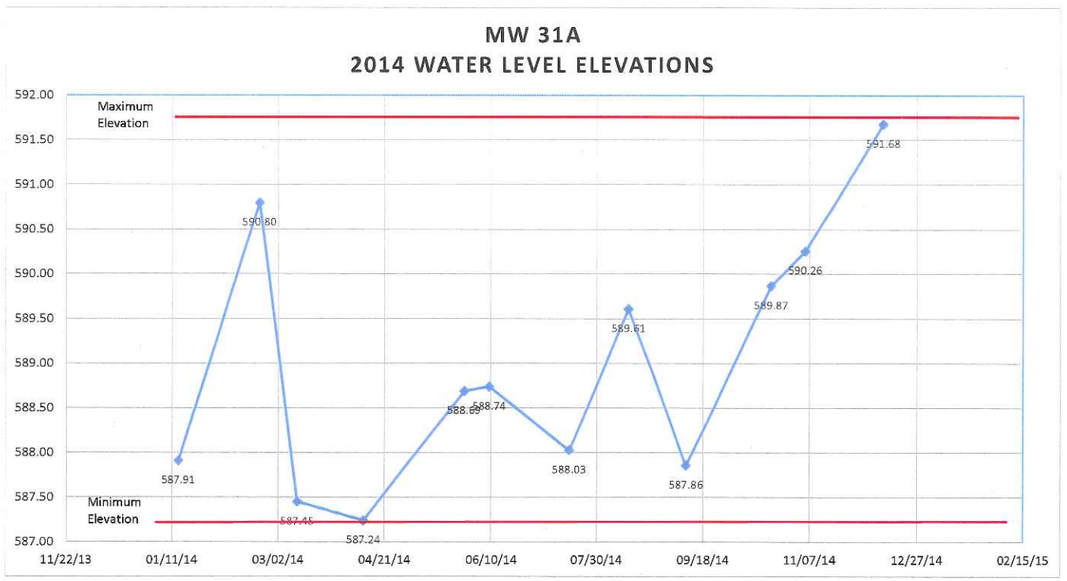
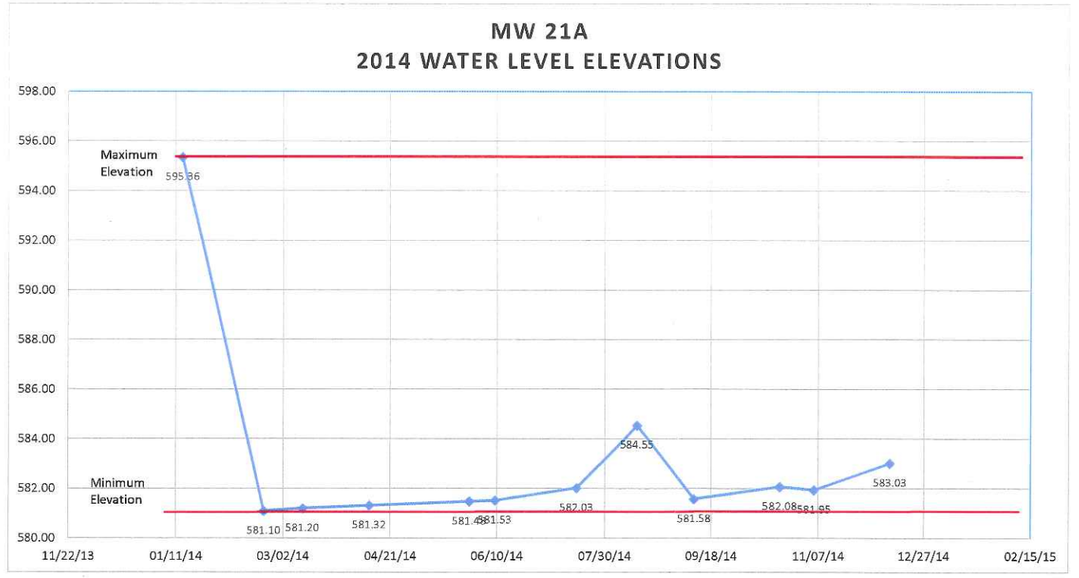








14-4055XLS Charts
1/14/2015

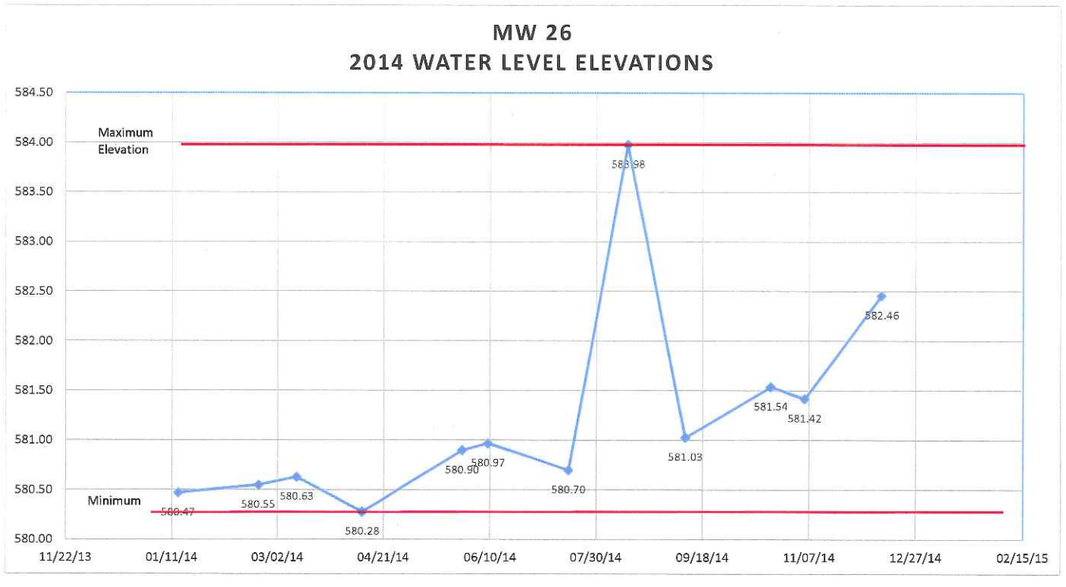
EMD Chemicals Inc.

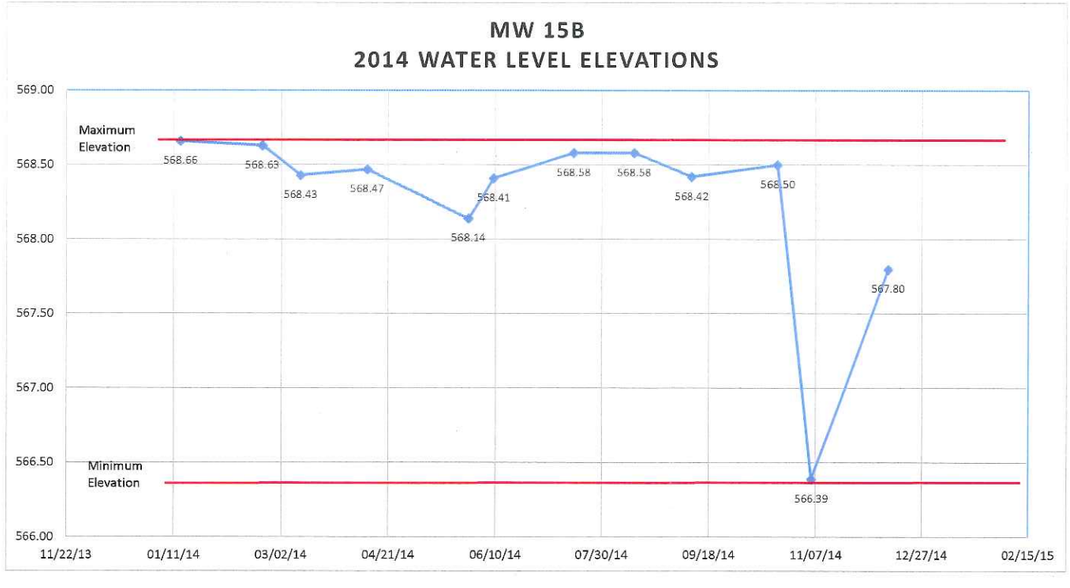
Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

Chart 2: On-Site Monitoring Well Locations





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1/14/2015

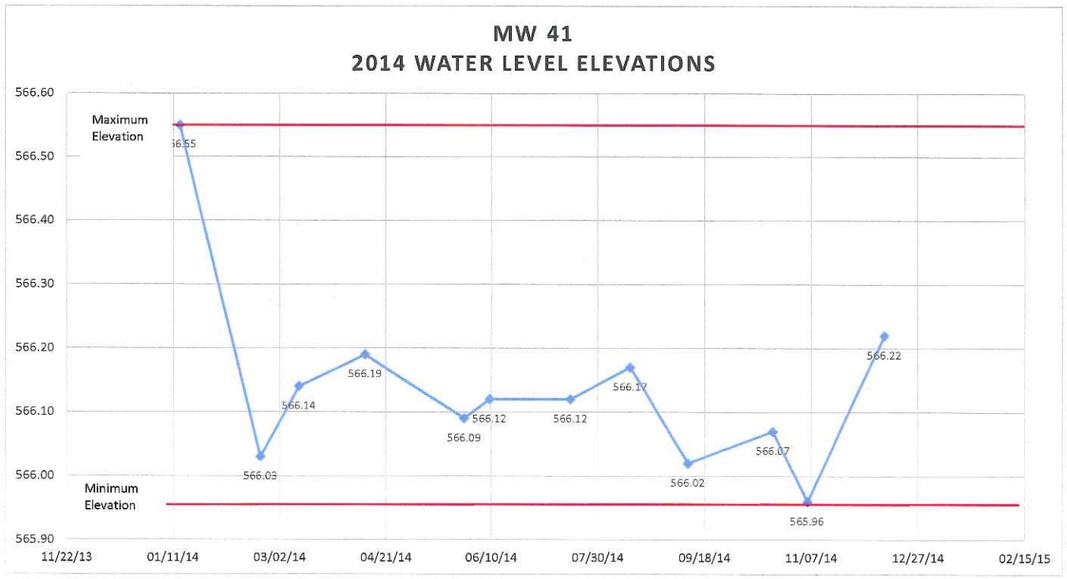
EMD Chemicals Inc.

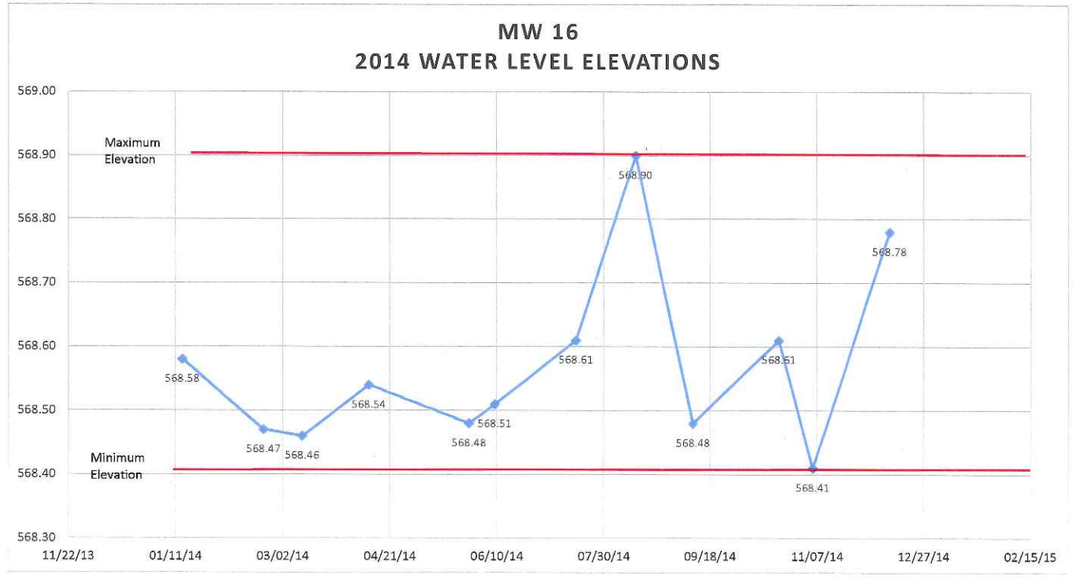
Norwood, Ohio

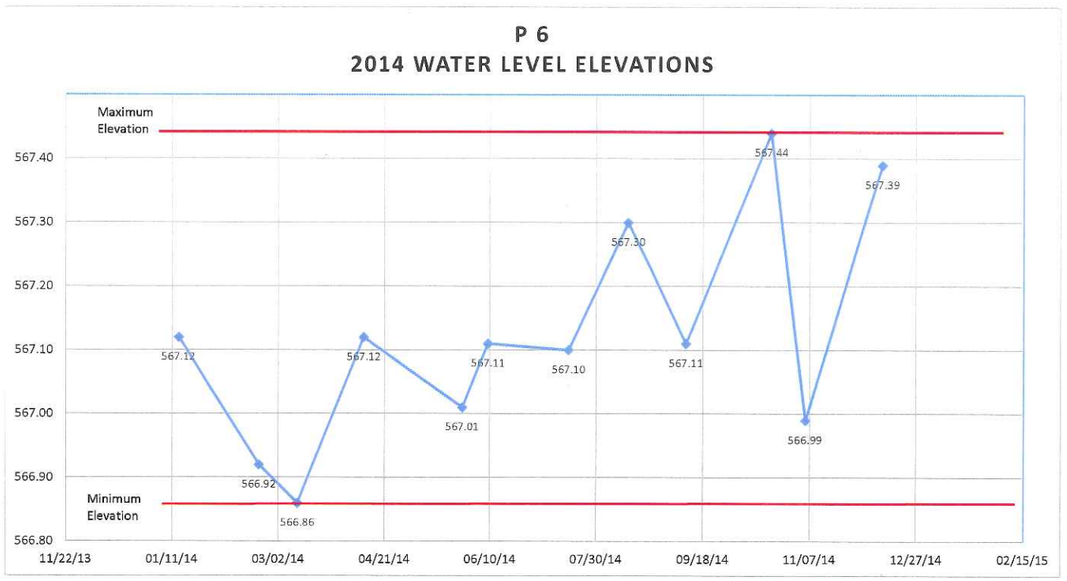
U.S. EPA ID No. OHD086438538

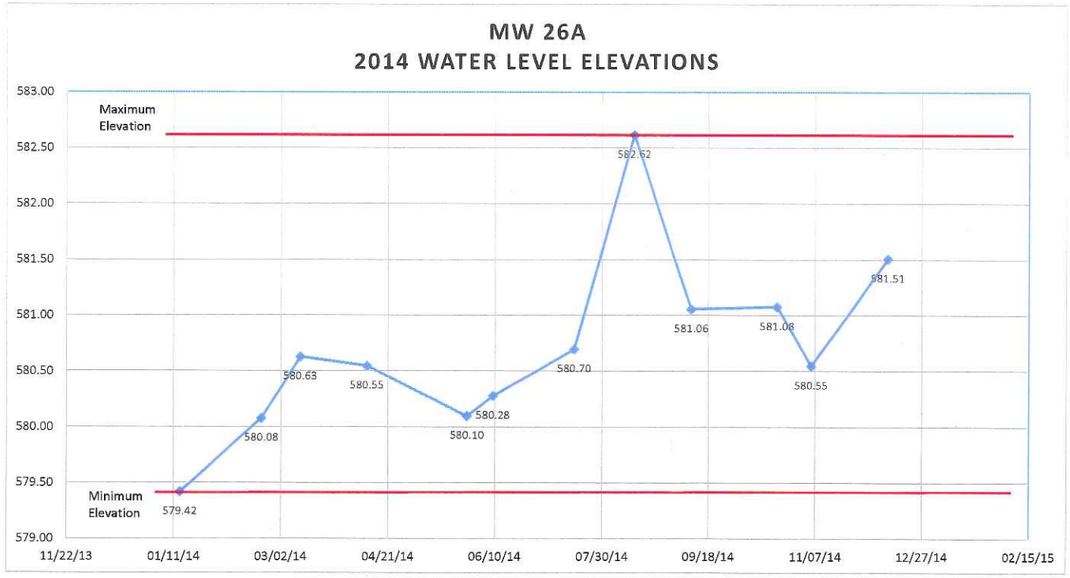
Project No. 213083.0000

Chart 2: On-Site Monitoring Well Locations









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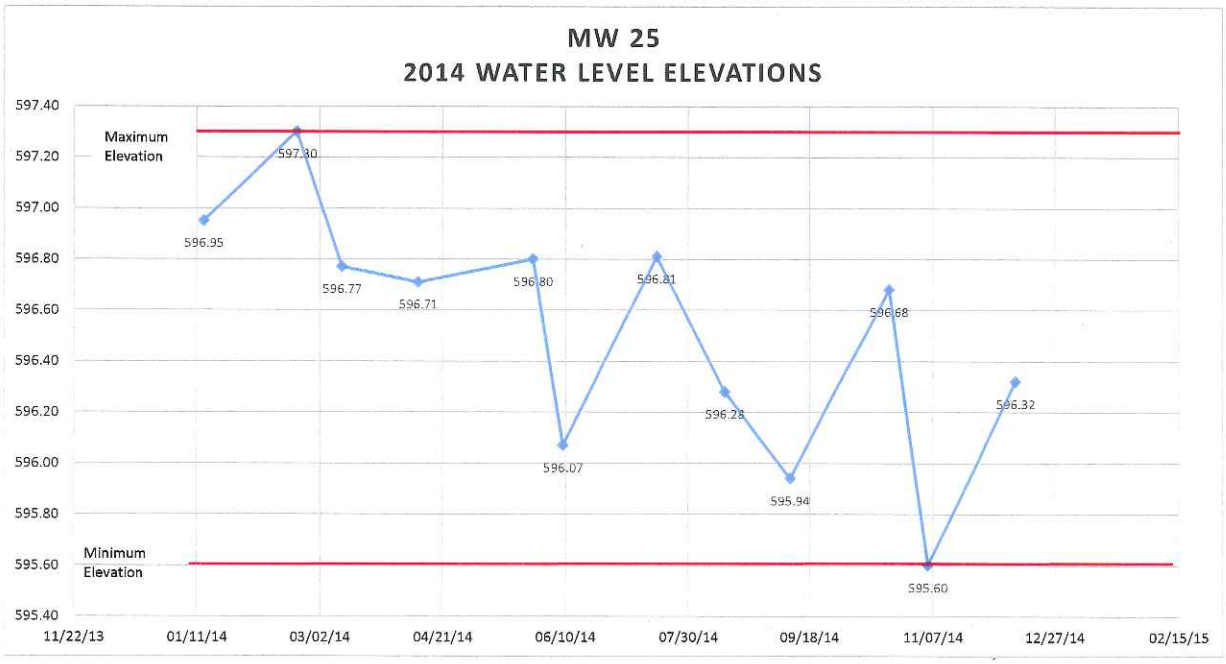
EMD Chemicals Inc.

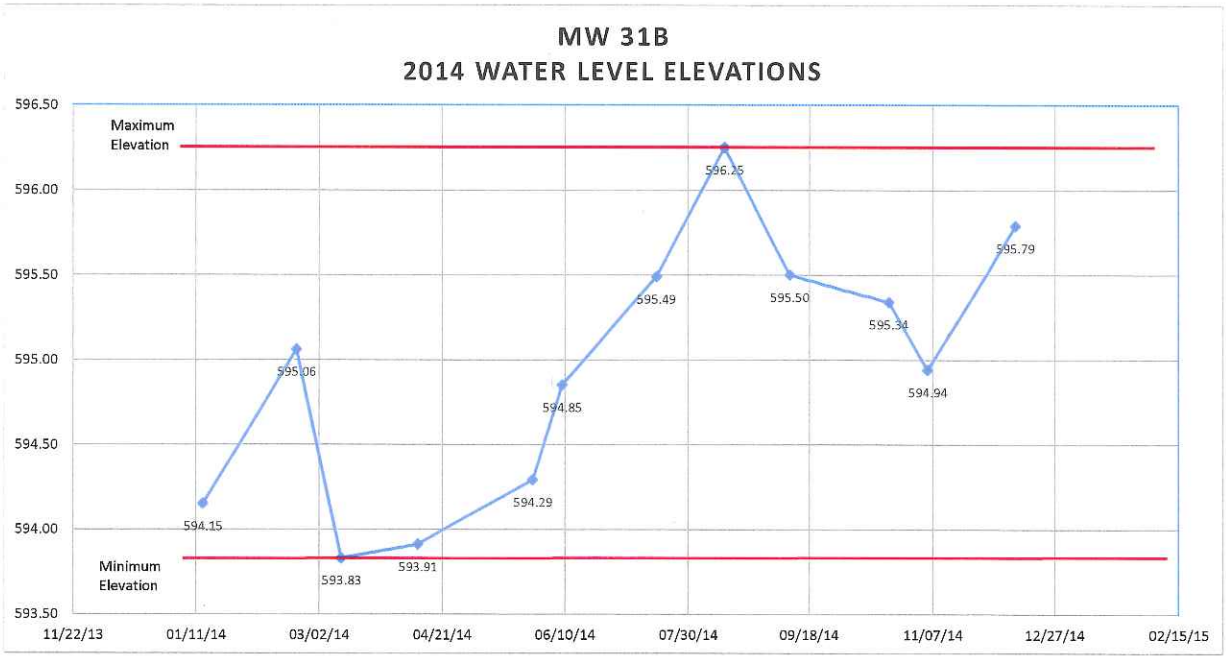
Norwood, Ohio

U.S. EPA ID No. OHD086438538

Project No. 213083.0000

Chart 2: On-Site Monitoring Well Locations





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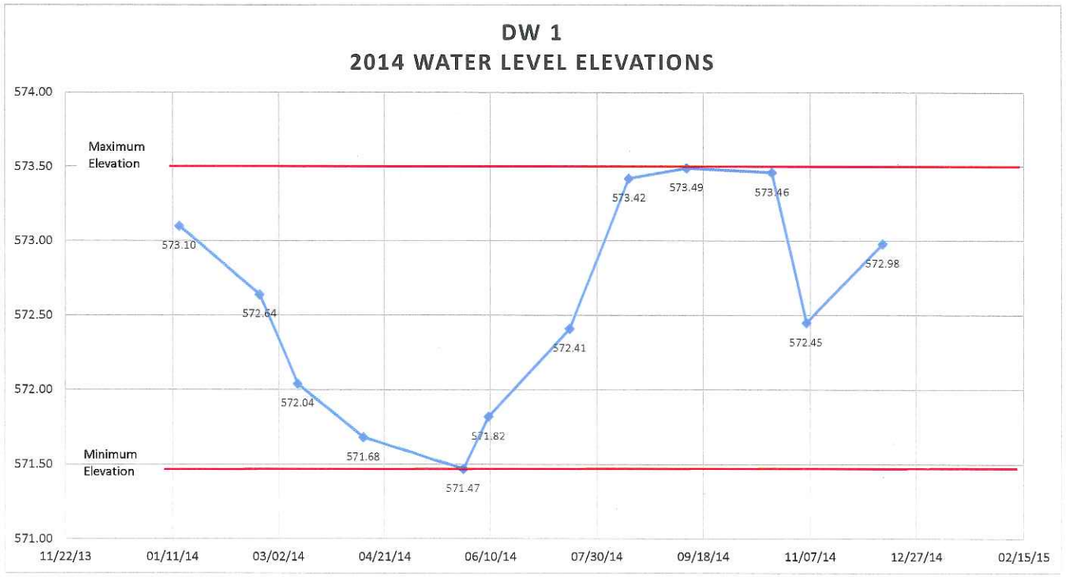

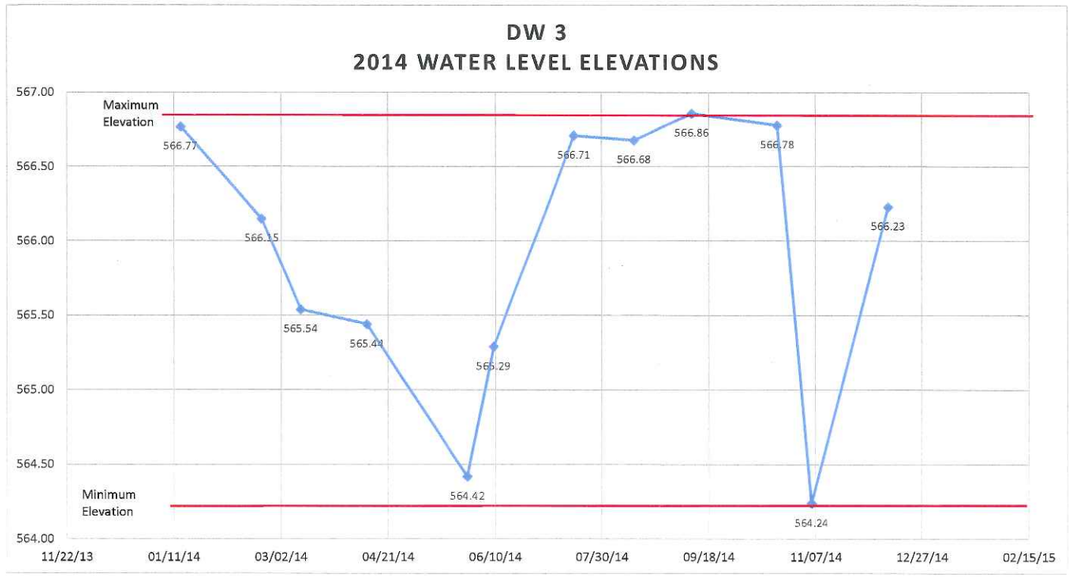

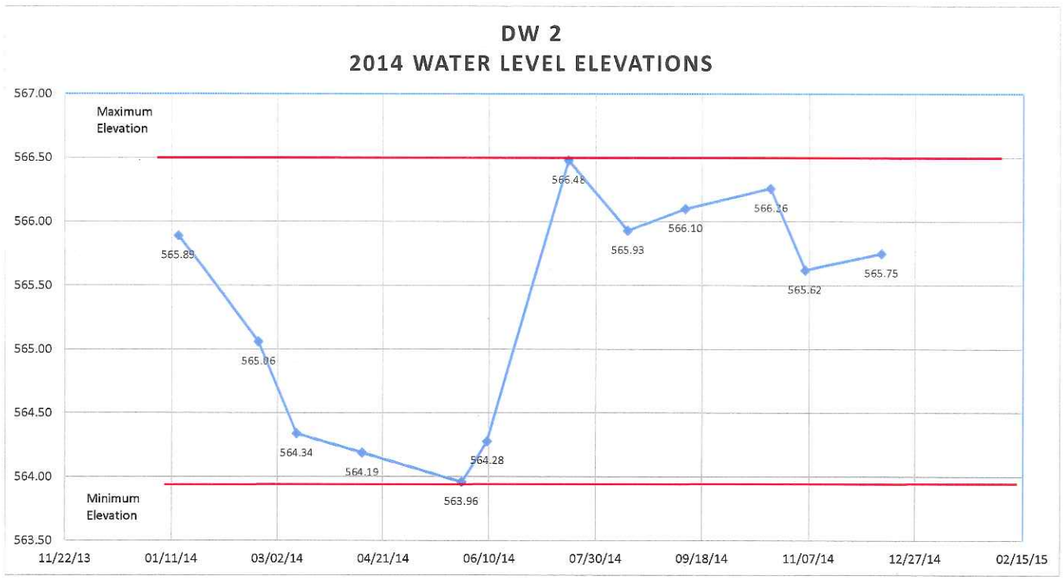

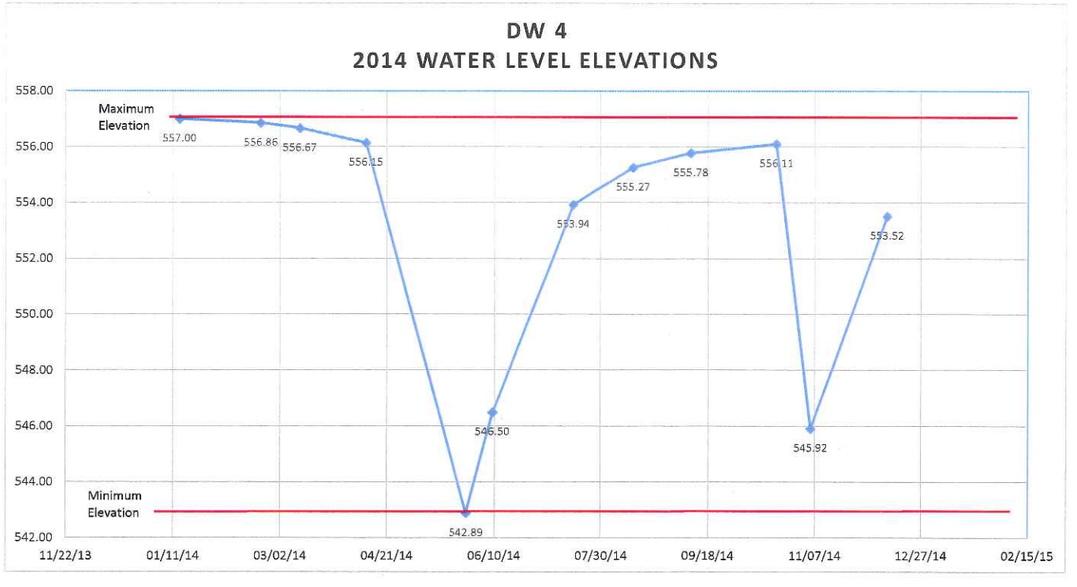

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Norwood, Ohio

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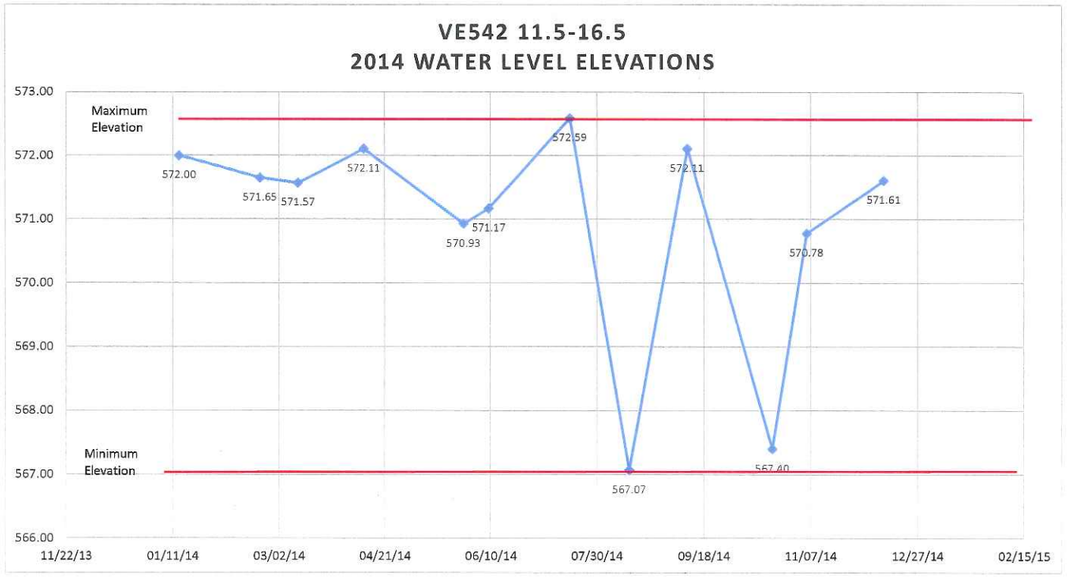

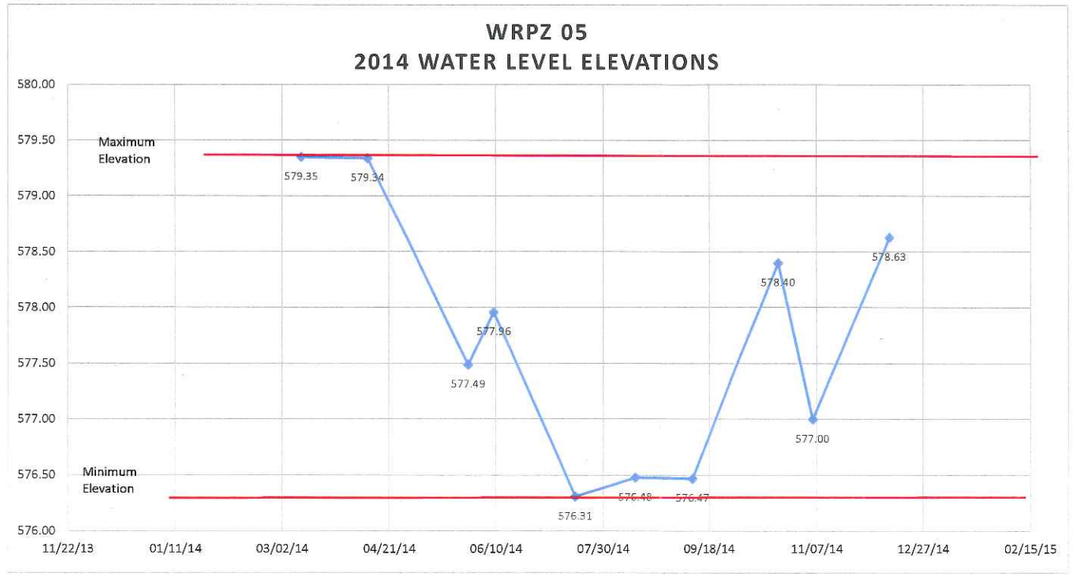

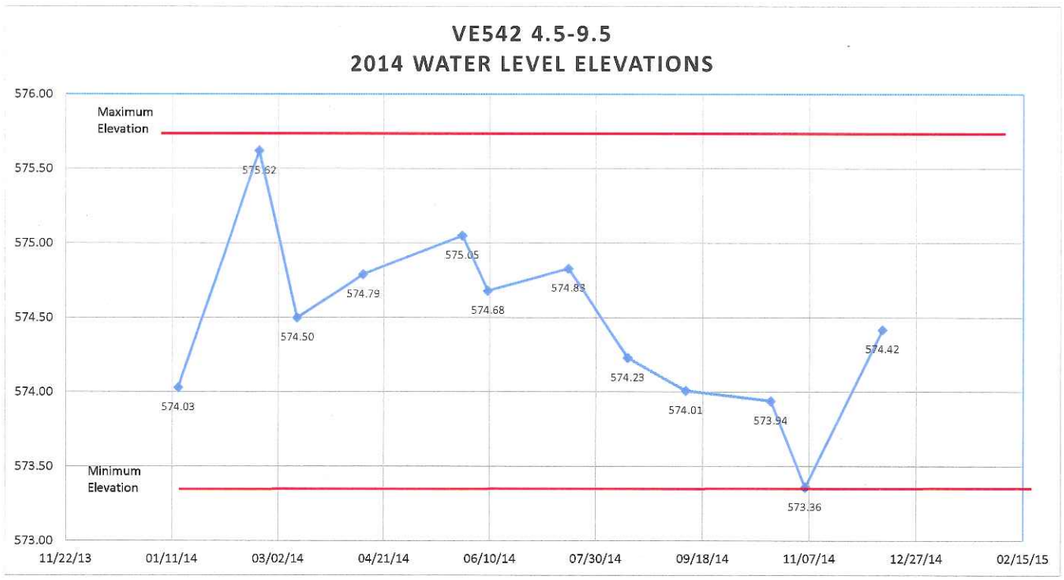

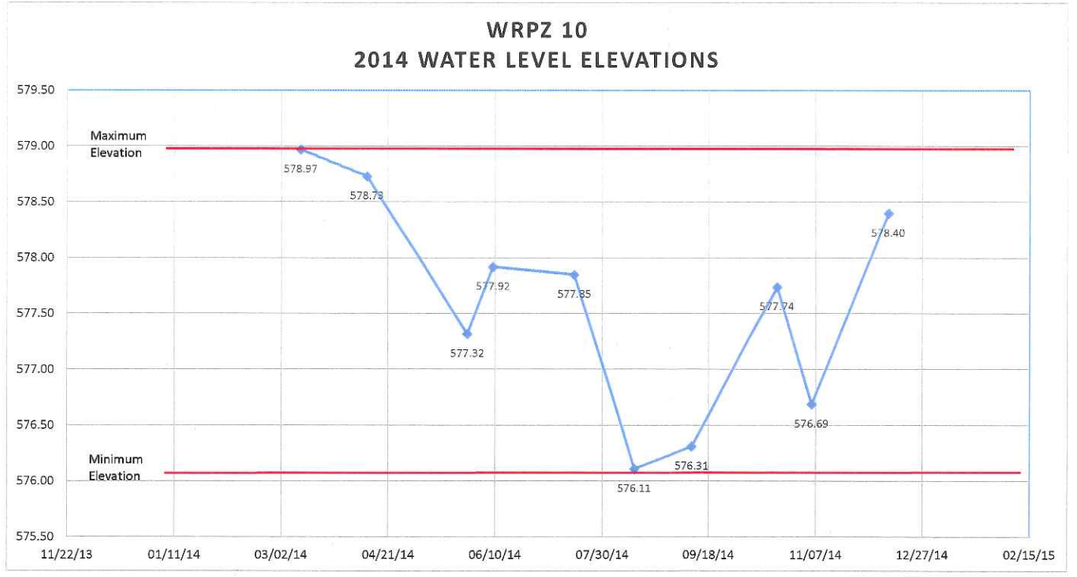

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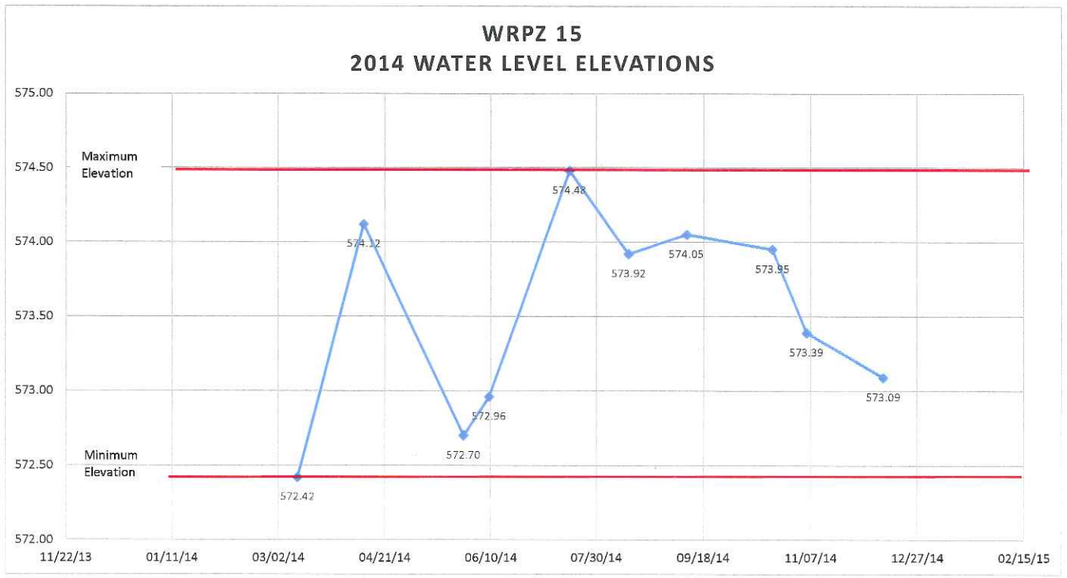
EMD Chemicals Inc.

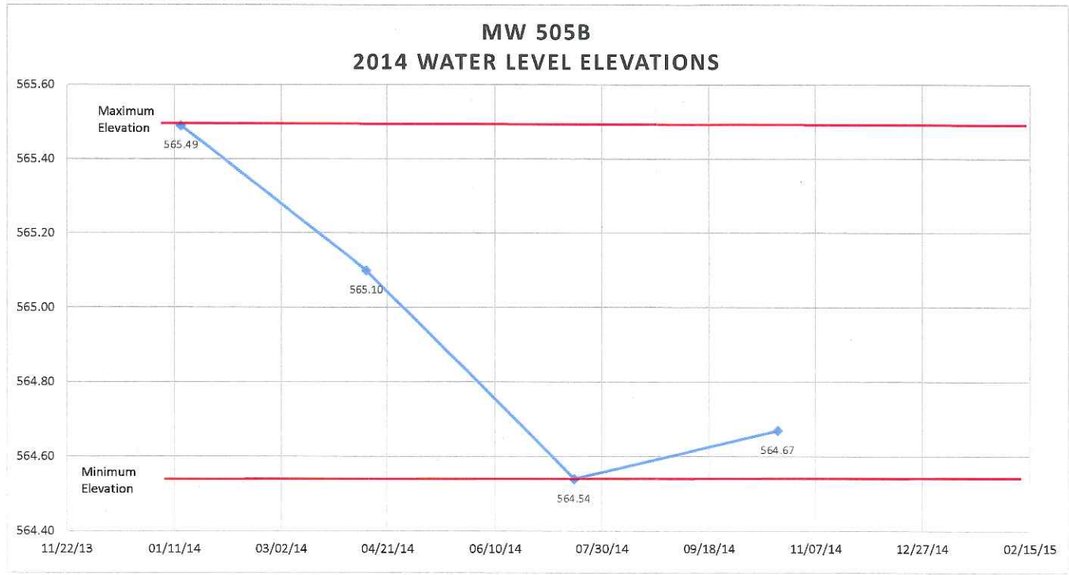
Norwood, Ohio

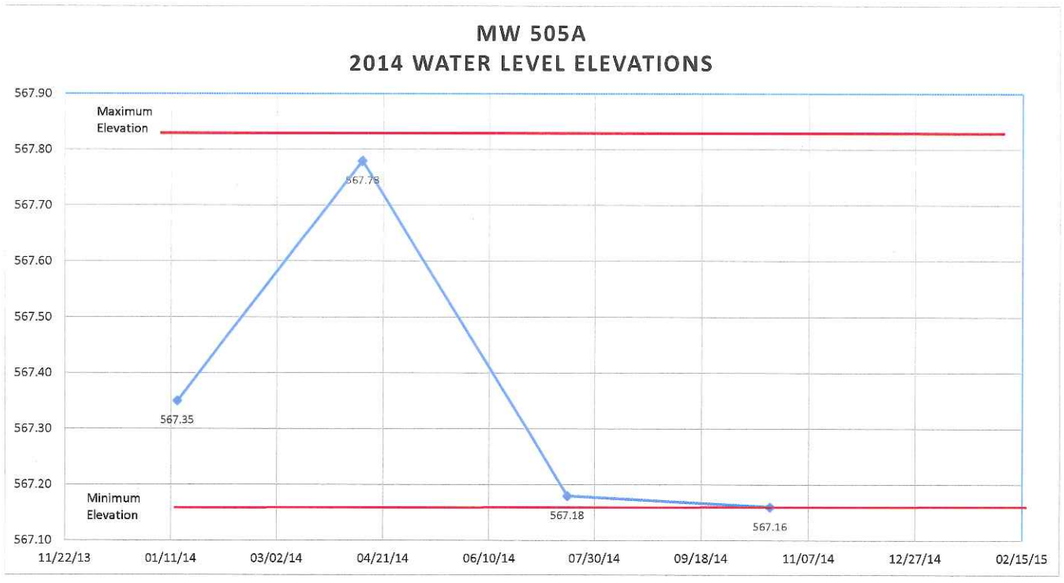
U.S. EPA ID No. OHD086438538

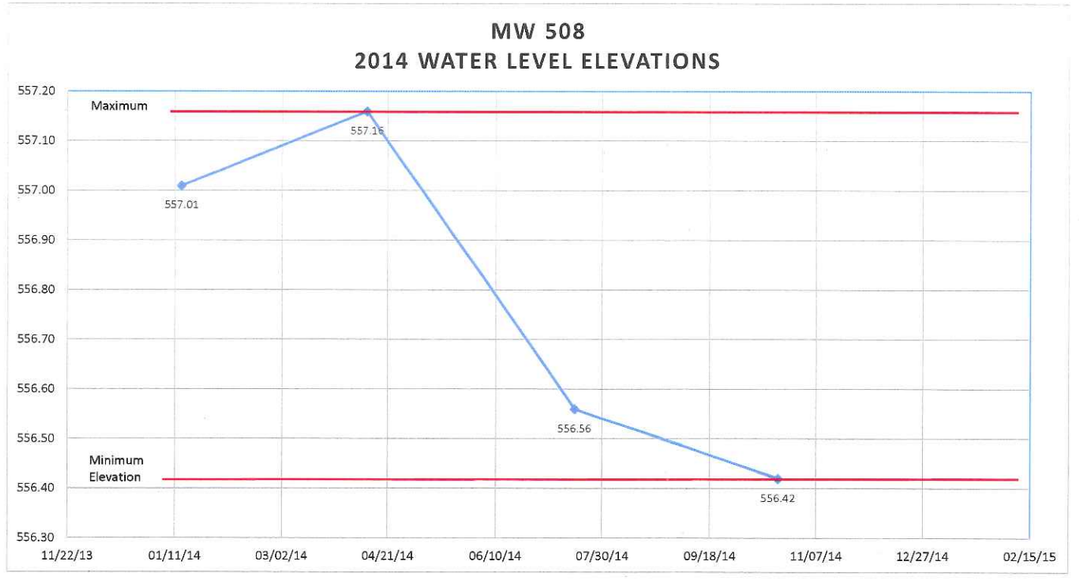
Project No. 213083.0000

Chart 2: Off-Site Monitoring Well Locations









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1/14/2015

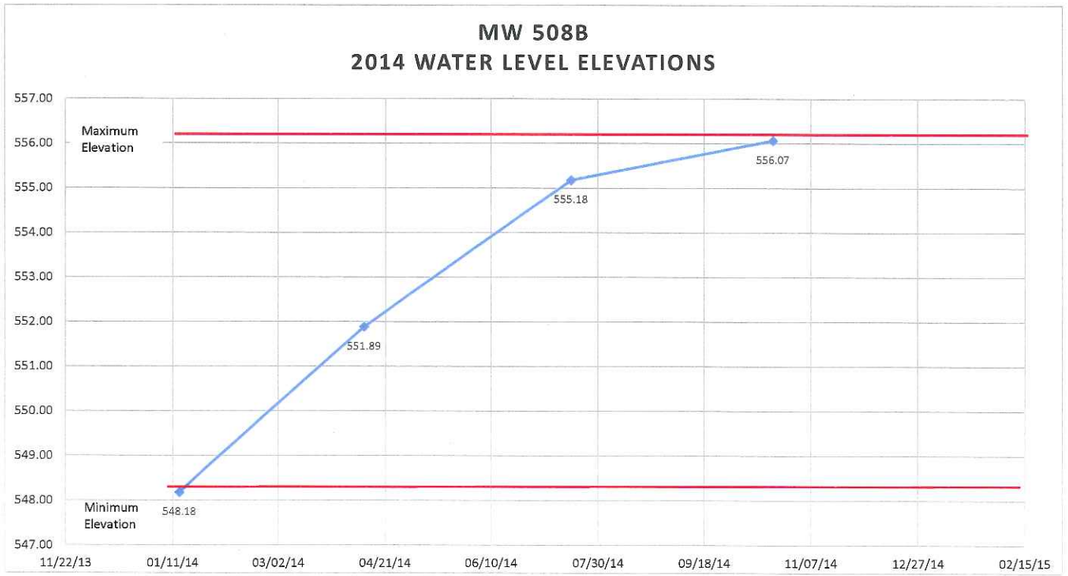
EMD Chemicals Inc.

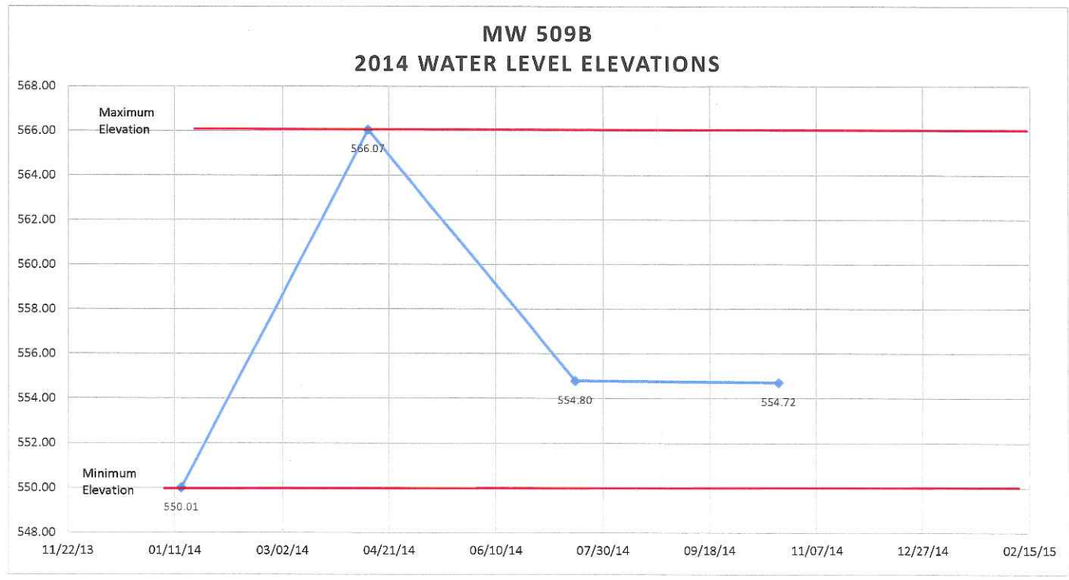
Norwood, Ohio

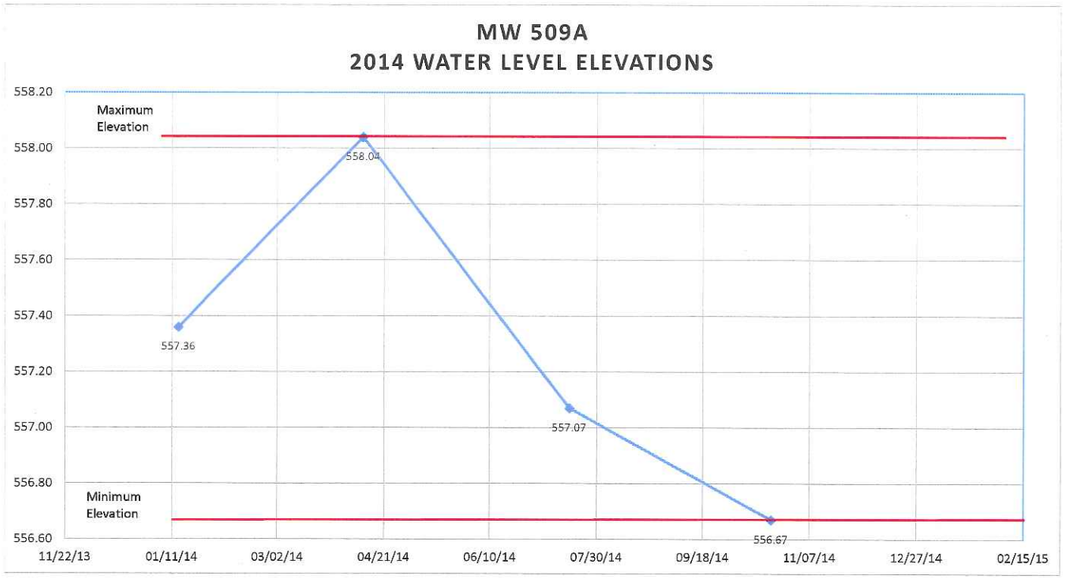
U.S. EPA ID No. OHD086438538

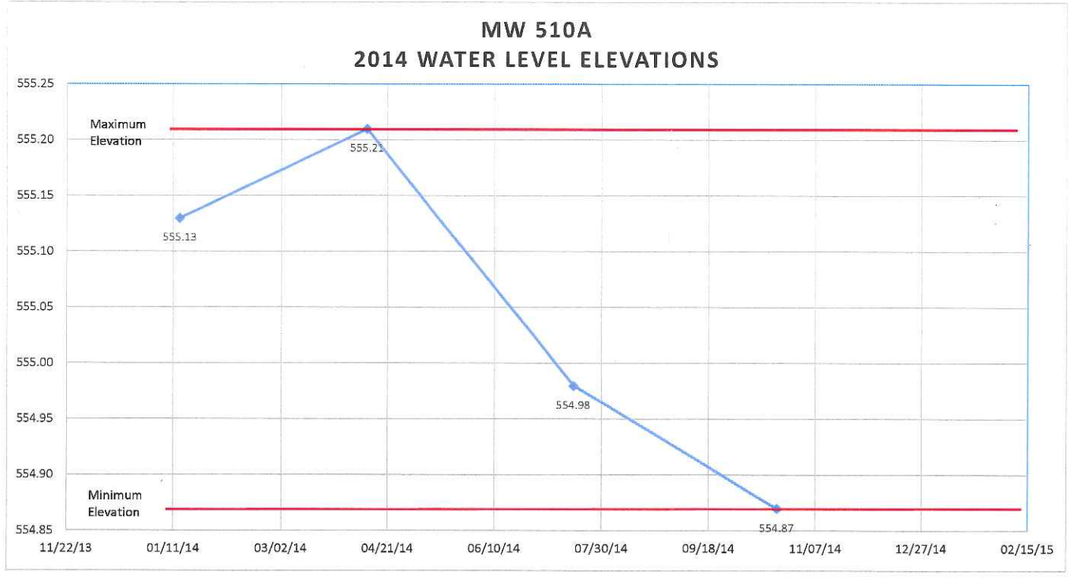
Project No. 213083.0000

Chart 2: Off-Site Monitoring Well Locations







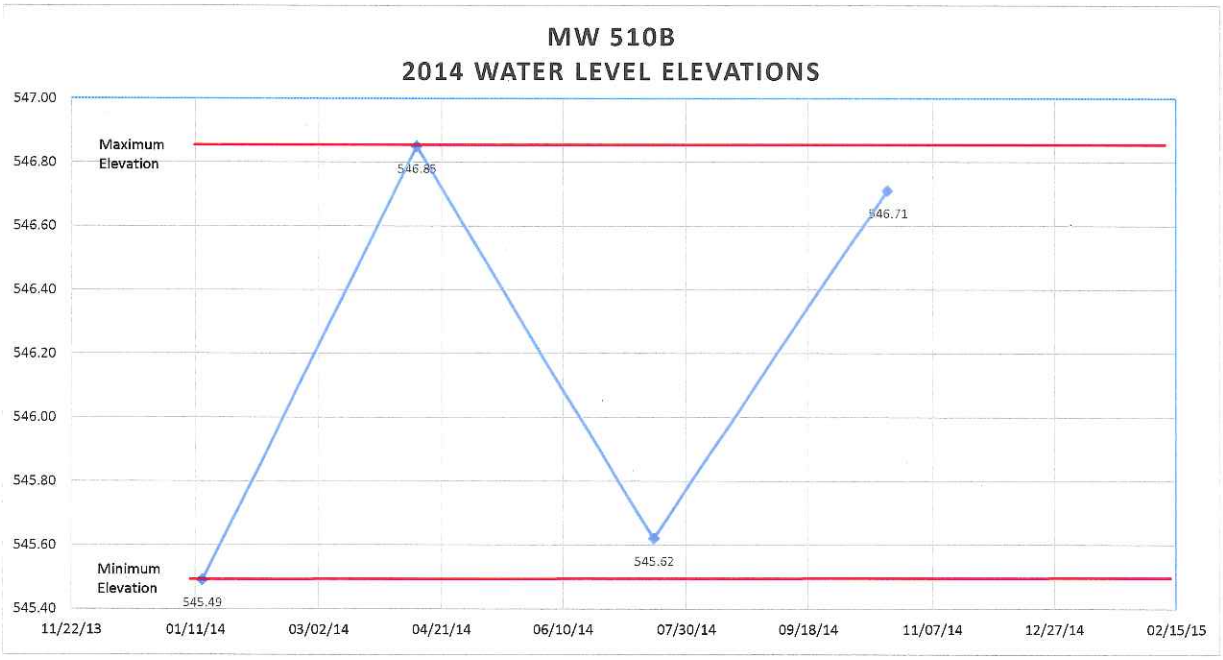


14-4055XLS/cau
1/14/2015

EMD Chemicals Inc.

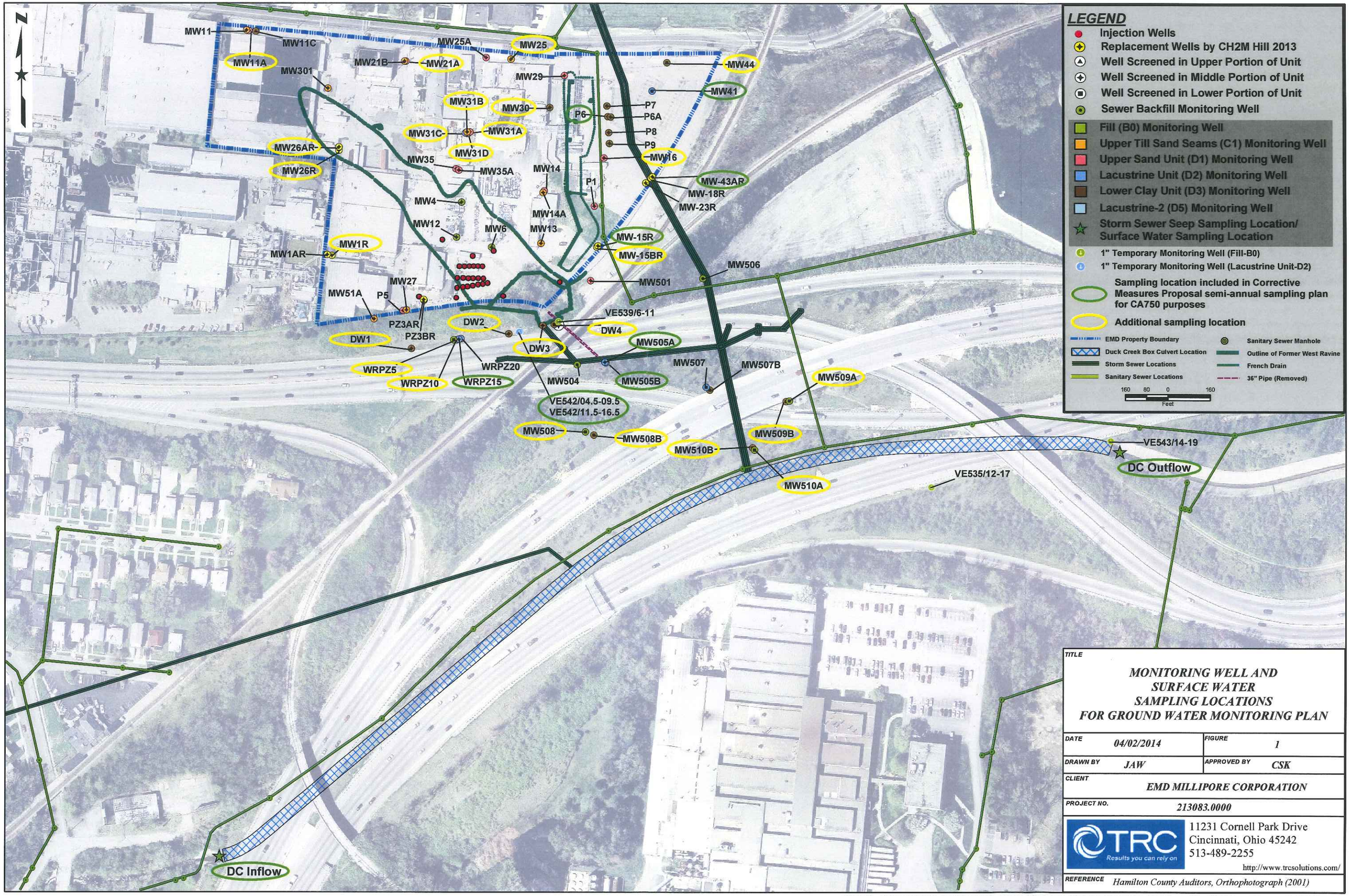
Norwood, Ohio
U.S. EPA ID No. OHD086438538
Project No. 213083.0000

Chart 2: Off-Site Monitoring Well Locations



14-4055XLS/cau
1/14/2015

FIGURES



TITLE

MONITORING WELL AND SURFACE WATER SAMPLING LOCATIONS FOR GROUND WATER MONITORING PLAN

DATE 04/02/2014	FIGURE 1
DRAWN BY JAW	APPROVED BY CSK
CLIENT EMD MILLIPORE CORPORATION	
PROJECT NO. 213083.0000	

TRC Results you can rely on
11231 Cornell Park Drive
Cincinnati, Ohio 45242
513-489-2255
http://www.trcsolutions.com/

REFERENCE Hamilton County Auditors, Orthophotograph (2001)

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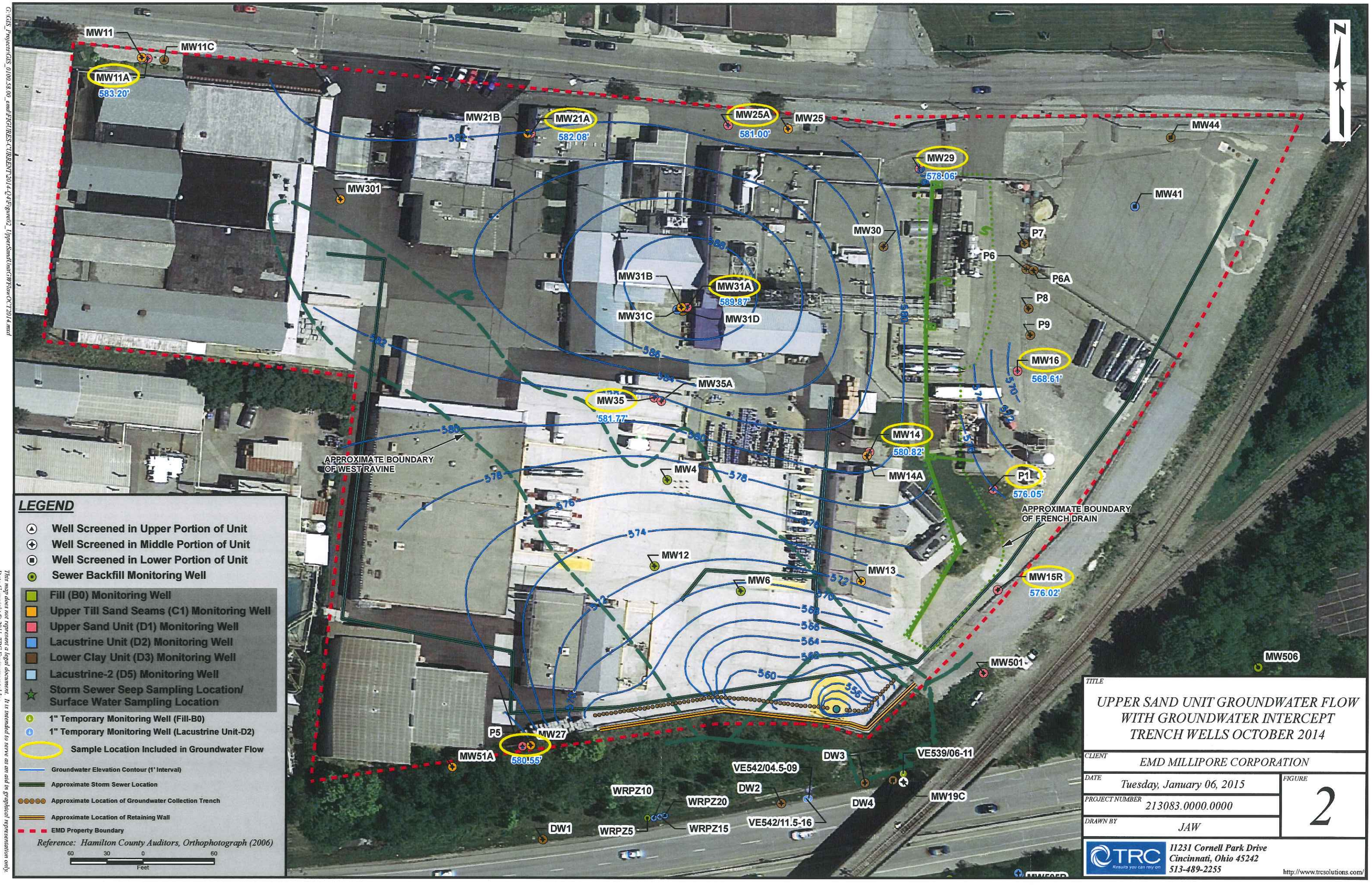

LEGEND

- Well Screened in Upper Portion of Unit
- Well Screened in Middle Portion of Unit
- Well Screened in Lower Portion of Unit
- Sewer Backfill Monitoring Well
- Fill (B0) Monitoring Well
- Upper Till Sand Seams (C1) Monitoring Well
- Upper Sand Unit (D1) Monitoring Well
- Lacustrine Unit (D2) Monitoring Well
- Lower Clay Unit (D3) Monitoring Well
- Lacustrine-2 (D5) Monitoring Well
- Storm Sewer Seep Sampling Location/ Surface Water Sampling Location
- 1" Temporary Monitoring Well (Fill-B0)
- 1" Temporary Monitoring Well (Lacustrine Unit-D2)
- Sample Location Included in Groundwater Flow
- Groundwater Elevation Contour (1' Interval)
- Approximate Storm Sewer Location
- Approximate Location of Groundwater Collection Trench
- Approximate Location of Retaining Wall
- EMD Property Boundary

Reference: Hamilton County Auditors, Orthophotograph (2006)

60 30 0 60
Feet

TITLE

UPPER SAND UNIT GROUNDWATER FLOW WITH GROUNDWATER INTERCEPT TRENCH WELLS OCTOBER 2014

CLIENT	*EMD MILLIPORE CORPORATION*
DATE	*Tuesday, January 06, 2015*
FIGURE	*2*
PROJECT NUMBER	*213083.0000.0000*
DRAWN BY	*JAW*

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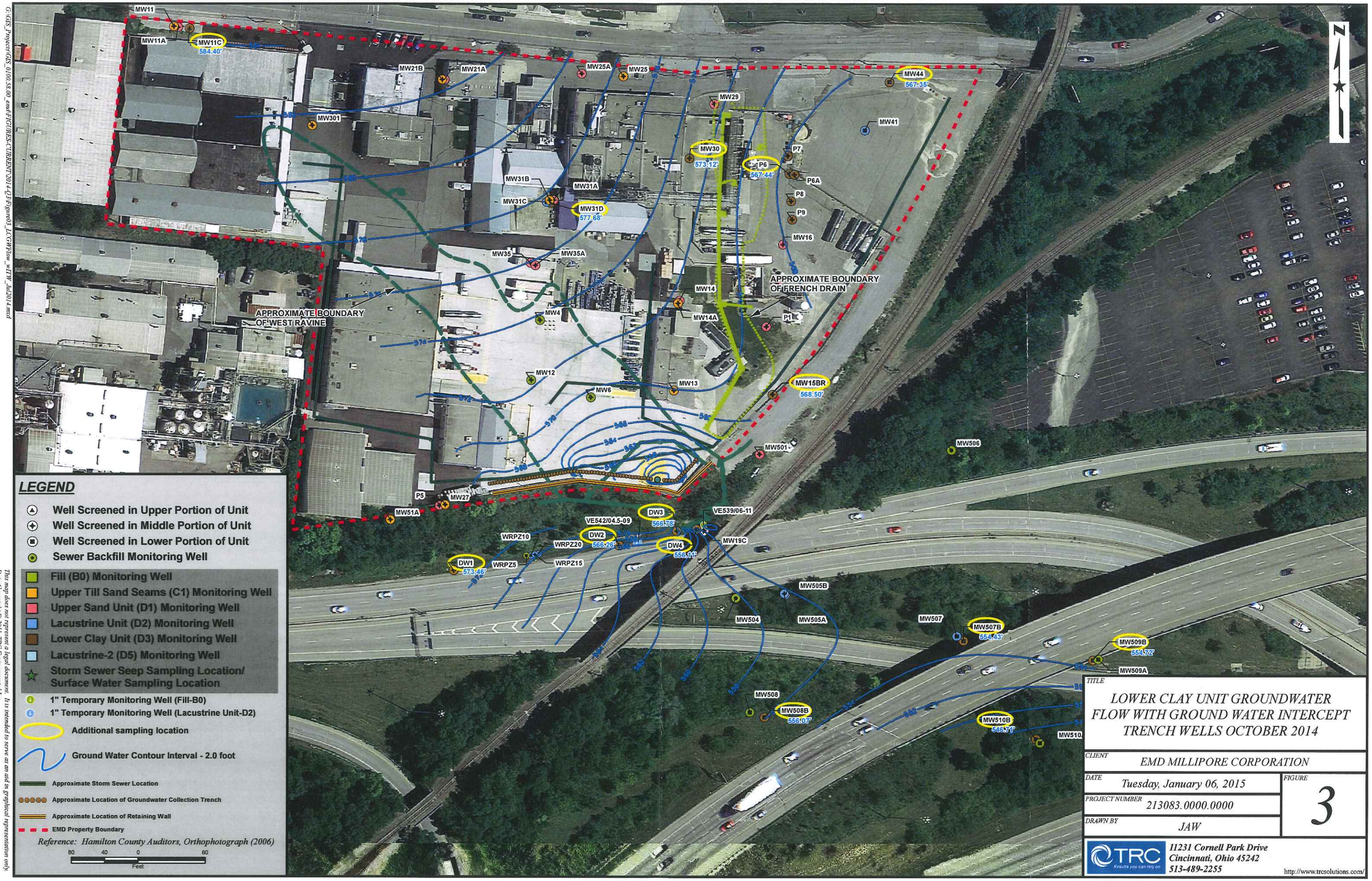

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This map does not represent a legal document. It is intended to serve as an aid in graphical representation only.

TITLE
LOWER CLAY UNIT GROUNDWATER FLOW WITH GROUND WATER INTERCEPT TRENCH WELLS OCTOBER 2014

CLIENT: *EMD MILLIPORE CORPORATION*

DATE: *Tuesday, January 06, 2015*

FIGURE: *3*

PROJECT NUMBER: *213083.0000.0000*

DRAWN BY: *JAW*

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APPENDIX I

DATA VALIDATION MEMO

MEMORANDUM

TRC Environmental Corporation

11231 Cornell Park Drive
Cincinnati, Ohio 45242
513-489-2255 Fax: 513-489-2533

TO: James A. Wasserbauer, Senior Project Manager

FROM: Curtis S. Kugler, Data Validation Coordinator

DATE: January 7, 2015

SUBJECT: EMD Chemicals Inc.
Norwood, Ohio
U.S. EPA ID #OHD086438538
Resource Conservation Recovery Act (RCRA)
Second 2014 Semi-Annual Ground Water Monitoring – Interim Performance Monitoring
TestAmerica Sample Delivery Groups: 240-43355, 240-43416 and 240-43473

PROJECT NO.: 213083.000004

The following details an analytical data validation for ground water collected during October 2014 at EMD Chemicals Inc., located in Norwood, Ohio. This sampling event was associated with the EMD Chemicals Inc., May 15, 2014, *Ground Water Monitoring Plan.* The environmental samples are identified in Table 1 and were analyzed for volatile organic compounds (VOCs) by United States Environmental Protection Agency (U.S. EPA) Method SW846-8260B. TestAmerica located in North Canton, Ohio performed all analyses.

This data quality assessment and validation process followed the procedures presented in Section 10.0 of the Quality Assurance Project Plan (QAPP) for the EMD Chemicals Inc. RCRA Voluntary Corrective Action. This process included the completion of a Data Validation Checklist, which is summarized below.

The analytical quality assessment and validation process included the completion of a Data Validation Checklist, which is attached and summarized below. The United States Environmental Protection Agency, *U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* and the *U.S. EPA Contract Laboratory Program, National Functional Guidelines for Superfund Inorganic Data Review* was utilized as guidance to complete the validation of this data set.

Overall Assessment

The data that were collected during this event exhibited acceptable levels of precision and accuracy and are usable for intended purposes with the exceptions noted below. The following discussion and attached

checklist support this conclusion. TRC has assigned qualifiers to samples and analytes as indicated in Table 1 with lower case letters. If multiple qualifiers have been assigned to samples and analytes from the laboratory (upper case letters) and TRC (lower case letters), the TRC qualifiers supersede the laboratory qualifiers.

1.0 Sample Report Completeness

TestAmerica provided all necessary components of the sample report included in the data package for data validation purposes. The components included the following.

a. Case Narrative

- Date of issuance
- Laboratory analysis performed
- Any deviations from intended analytical strategy
- Laboratory batch number
- Numbers of samples and respective matrices
- QC procedures utilized and also references to the acceptance criteria
- Laboratory report contents
- Project name and number
- Condition of samples "as-received"
- Discussion of whether or not sample holding times were met
- Discussion of technical problems or other observations which may have created analytical difficulties
- Discussion of any laboratory QC checks which failed to meet project criteria
- Signature of Laboratory QA Manager

b. Chemistry Data Package

- Case narrative for each analyzed batch of samples
- Summary page indicating dates of analyses for samples and laboratory QC checks
- Cross referencing of laboratory sample to project sample identification numbers
- Description of data qualifiers to be used
- Sample preparation and analyses for samples
- Sample results
- Raw data for sample results and laboratory QC samples
- Results of (dated) initial and continuing calibration checks, and GC/MS turning results
- MS/MSD recoveries, laboratory control samples, method blank results, calibration check compounds, and system performance check compound results
- Labeled (and dated) chromatograms/spectra of sample results and laboratory QC checks
- Chain-of-custody
- Electronic deliverables

2.0 Holding Time Periods

As indicated by the sample collection and analysis dates on the chain-of-custody forms and the analytical report provided by TestAmerica, all samples were prepared and analyzed within the required holding time period for VOCs.

3.0 Quality Assurance

System Monitoring Compounds/Surrogate Spikes
Laboratory performance on individual samples for organic analysis was monitored by using percent recoveries of system monitoring compounds/surrogate spikes. The surrogate recoveries for the environmental and quality assurance/quality control (QA/QC) samples met the acceptance criteria.

Matrix Spike/Matrix Spike Duplicate (MSD/MSD Results)
To assess long-term accuracy and precision of the analytical methods on sample matrices, MS/MSD percent recoveries and the relative percent difference (RPD) of the recoveries were determined by TestAmerica. TestAmerica reported MS/MSD results outside the established limits. These MS/MSD results were reviewed by TRC and no action was taken.

Laboratory Control Sample (LCS)
The laboratory control sample percent recoveries were examined to assess the overall performance and the accuracy of laboratory procedures. The LCS samples met the acceptance criteria.

Method Blank Samples
Contamination of the environmental samples contributed by laboratory conditions or procedures was monitored by the concurrent preparation and analysis of method blank samples. Acetone and methylene chloride were detected in separate method blank samples. The associated acetone and methylene chloride detections that confirm to the 10X rule are qualified as "u" (non-detect) by TRC. Table 1 summarizes the qualifiers assigned by TRC.

4.0 Field Quality Assurance/Quality Control (QA/QC)

Field QA/QC
The field QA/QC samples collected consisted of two trip blank samples, three field blank samples, two duplicate samples, and one rinseate sample and are summarized in Table 1. The relative percent difference of 1,4-dioxane in the parent sample, MW-031B, and duplicate sample, DUP-01, exceeds the acceptance criteria. The 1,4-dioxane detected in the duplicate sample is qualified as "j" (estimated) by TRC. Table 1 summarizes the qualifiers assigned by TRC.

General Comments

Samples that contained results for VOCs between the TestAmerica method detection limit (MDL) and the reporting limit (RL) were qualified "J" by TestAmerica. Results between the MDL and/or below the RL indicate the possibility for false-positive or misidentification. All "J" qualified results were reviewed with no action taken. The pH of sample VE542/11.5-16.5/102114 was less than 2. 1,4-dioxane was the only constituent detected and is qualified as "j" (estimated) by TRC.

Table 1: Sample Identification (Second 2014 Semi-Annual Event)

Report	Field Sample ID	Lab Sample ID	Matrix	Sample Date	Analysis Date	Analysis Group	TRC Qualifier	Qualifier Summary
240-43355-1	DCINFLOW/102014	240-43355-1	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	DCOUTFLOW/102014	240-43355-2	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	DW001/102014	240-43355-3	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	DW002/102014	240-43355-4	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	DW003/102014	240-43355-5	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	DW004/102014	240-43355-6	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	FB02/102114	240-43355-8	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	MW031A/102114	240-43355-21	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW031D/102114	240-43355-22	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW505A/102114	240-43355-13	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	MW505B/102114	240-43355-14	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	MW508/102114	240-43355-19	WATER	21-Oct-14	31-Oct-14	VOLATILES	u (estimated) = acetone	method blank detection
240-43355-1	MW508B/102114	240-43355-20	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW509A/102114	240-43355-15	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW509B/102114	240-43355-16	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW510A/102114	240-43355-17	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	MW510B/102114	240-43355-18	WATER	21-Oct-14	31-Oct-14	VOLATILES		
240-43355-1	TB01/102014	240-43355-7	WATER	20-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	VE542/11.5-16.5/102114	240-43355-10	WATER	21-Oct-14	30-Oct-14	VOLATILES	j (estimated) = 1,4-dioxane	sample not preserved to a pH less than 2
240-43355-1	WRPZ05/102114	240-43355-9	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	WRPZ10/102114	240-43355-11	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43355-1	WRPZ15/102114	240-43355-12	WATER	21-Oct-14	30-Oct-14	VOLATILES		
240-43416-1	FB01/102214	240-43416-2	WATER	22-Oct-14	29-Oct-14	VOLATILES		
240-43416-1	MW001R/102214	240-43416-12	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW011A/102214	240-43416-9	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW015BR/102214	240-43416-13	WATER	22-Oct-14	31-Oct-14	VOLATILES	u (estimated) = methylene chloride	method blank detection

Table 1: Sample Identification (Second 2014 Semi-Annual Event)

Report	Field Sample ID	Lab Sample ID	Matrix	Sample Date	Analysis Date	Analysis Group	TRC Qualifier	Qualifier Summary
240-43416-1	MW015R/102214	240-43416-14	WATER	22-Oct-14	31-Oct-14	VOLATILES	u (estimated) = methylene chloride	method blank detection
240-43416-1	MW021A/102214	240-43416-15	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW025/102214	240-43416-16	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW026AR/102214	240-43416-11	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW026R/102214	240-43416-10	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW031B/102214	240-43416-1	WATER	22-Oct-14	30-Oct-14	VOLATILES		
240-43416-1	DUP01/102214	240-43416-4	WATER	22-Oct-14	31-Oct-14	VOLATILES	j (estimated) = 1,4-dioxane	RPD between parent sample and duplicate exceeds limit
240-43416-1	MW031C/102214	240-43416-8	WATER	22-Oct-14	01-Nov-14	VOLATILES	u (estimated) = methylene chloride	method blank detection
240-43416-1	MW041/102214	240-43416-7	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	MW044/102214	240-43416-6	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43416-1	RIN01/102214	240-43416-3	WATER	22-Oct-14	29-Oct-14	VOLATILES		
240-43416-1	TB02/102214	240-43416-5	WATER	22-Oct-14	31-Oct-14	VOLATILES		
240-43473-1	MW016/102314	240-43473-1	WATER	23-Oct-14	01-Nov-14	VOLATILES	u (estimated) = methylene chloride	method blank detection
240-43473-1	MW030/102314	240-43473-3	WATER	23-Oct-14	01-Nov-14	VOLATILES		
240-43473-1	MW043AR/102314	240-43473-4	WATER	23-Oct-14	01-Nov-14	VOLATILES		
240-43473-1	P0006/102314	240-43473-2	WATER	23-Oct-14	01-Nov-14	VOLATILES		
240-43473-1	TB03/102314	240-43473-7	WATER	23-Oct-14	01-Nov-14	VOLATILES		
240-43473-1	VE542/04.5-09.5/102114	240-43473-5	WATER	21-Oct-14	31-Oct-14	VOLATILES	u (estimated) = methylene chloride	method blank detection
240-43473-1	DUP02/102114	240-43473-6	WATER	23-Oct-14	01-Nov-14	VOLATILES	u (estimated) = methylene chloride	method blank detection

DUP - duplicate sample
TB - trip blank sample
FB - field blank sample
RIN - rinseate sample
DUP01 collected from MW031B
DUP02 collected from VE542/04.5-09.5

TRC Environmental Corporation
Data Validation Checklist

Project: EMD Chemicals Inc.
Sampling Event Description: Second 2014 Semi-Annual Ground Water Monitoring – Interim Performance Monitoring
Reviewer: Curtis S. Kugler, Data Validation Coordinator
Sample Delivery Groups: 240-43355, 240-43416 and 240-43473
Laboratory Name: TestAmerica – North Canton
Checklist Completion Date: December 22, 2014

Note: "X" – Applies; "--" – Does Not Apply

1.0	**Sample Report Completeness**	
This Section provides a checklist of important components of data reports. If the report is incomplete, it may be necessary to halt data validation procedures until all missing information is provided.		
1.1	Review any discrepancies between the chain-of-custody (COC) and submitted sampling data.	X
1.2	Presence of signed laboratory statement that attests to the validity of the data.	X
1.3	Presence of case narrative that summarizes QA/QC discrepancies and/or other problems.	X
1.4	Are COC forms present for all samples?	X
1.5	Review the COC forms, Sample Receipt form, or the Case Narrative for any problems with the sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data.	X
1.6	Were Custody Seals present and intact?	X
1.7	Is a Sample receipt form present?	X
2.0	**Holding Times**	
Technical holding times are an important component of assuring that data is valid and not biased from inappropriate handling procedures.		
2.1	**Holding Times – Volatile Organic Compounds**	
2.1.1	Are samples properly preserved? Check preservation requirements, chain-of-custody, and sample receipt form for discrepancies.	X
2.1.2	If samples were improperly preserved, or unpreserved, and the technical holding times were exceeded, qualify all positive results for affected samples as "J" estimated and all non-detected results as "UJ" estimated undetected.	X
2.1.3	If samples were properly preserved, but technical holding times were exceeded, qualify all positive results for affected samples as "J" estimated and all non-detected results as "UJ" estimated undetected.	X
2.1.4	If technical holding times are greatly exceeded (>2x the time requirement) upon analysis or re-analysis then the reviewer may use professional judgment to qualify all non-detected compounds as "R" rejected and all positive results as "J" estimated.	X

2.2	**Holding Times – Semi-Volatile Organic Compounds**	
2.2.1	If technical holding times are exceeded, qualify all positive results for affected samples as "J" estimated and all non-detected results as "UJ" estimated undetected.	--
2.2.2	If holding times are greatly exceeded (>2x the time requirement), the reviewer may use professional judgment to qualify all non-detected compounds as "R" rejected and all positive results as "J" estimated.	--
2.3	**Holding Times Inorganic Compounds**	
2.3.1	Review whether samples were properly preserved (4 degrees Celsius for solids: acid preservation for aqueous).	--
2.3.2	If samples were improperly preserved and the holding times were exceeded, qualify all positive results for affected samples as "J" estimated and all non-detected results as "UJ" estimated undetected.	--
2.3.3	If samples were properly preserved, but technical holding times were exceeded, qualify all positive results for affected samples as "J" estimated and all non-detected results as "UJ" estimated undetected.	--
2.3.4	If holding times are greatly exceeded (>2x requirement), the reviewer may use professional judgment to qualify all non-detect compounds as "R" rejected and all positive results as "J" estimated.	--
2.4	**Holding Times – pH**	
2.4.1	If technical holding times are exceeded the reviewer may use professional judgment to qualify data as "R" rejected or "J" estimated.	X
3.0	**Quality Assurance Summary Data Review**	
VOC Surrogate Compound Recovery – Surrogate compounds are spiked compounds of known composition that are added to samples and blanks. The recovery of surrogate compounds allows an assessment interference. VOC surrogate recoveries are used with other QA/QC data to qualify sample results and to justify laboratory re-analysis.		
3.1.1	Were surrogate recoveries present for each batch?	X
3.1.2	Were any outliers marked correctly (based upon the laboratory's criteria)?	X
3.1.3	If any surrogate compound was out of compliance was re-analysis performed to confirm matrix interference?	X
3.2	**SVOC Surrogate Compound Recovery – Surrogate compounds are spiked compounds of known composition that are added to samples and blanks. The recovery of surrogate compounds allows an assessment of matrix interference. SVOC analyses include compounds that can be divided into two classes: acid compounds and base/neutral compounds. Each class has a specific assigned set of surrogate compounds.**	
3.2.1	Are the surrogate recovery data present for each batch (method and matrix), including TCLP?	--
3.2.2	Were any outliers marked correctly?	--
3.2.3	If any two surrogate compounds in either the acid or base/neutral classes were out of compliance, was re-analysis performed to confirm a matrix interference? Note: Check the report narrative for an indication of re-analysis.	--
3.2.4	If any one surrogate compound has a recovery of less than 10% in either the acid or base/neutral classes, check for indications that re-analysis was performed to confirm a matrix interference?	--
3.2.5	Based on the findings, qualify data in either the acid or base/neutral classes with the following criteria:	--

	Note: Qualification may not be appropriate for TCLP data. Best professional judgment may be used to qualify data. Action: If two surrogates in a particular class are above the upper control limit, all positive results, for that fraction, in that class should be qualified as "J." If any two surrogates in a particular class have recoveries less than the lower criteria, but the recovery is greater than or equal to 10%, all detected compounds, for that fraction, should be qualified as "J." If any surrogate in a particular class has recoveries less than 10%, all detected compounds, for that fraction, should be qualified as "J" estimated and all non detected compounds as "R" rejected.	
3.3	**Quality Assurance Summary Review – Matrix Spike/Matrix Spike Duplicates**	
Matrix spike and matrix spike duplicates are performed to assess method precision for VOC and SVOC analyses. Matrix spikes and duplicates are required for every batch of samples (every 20 - 30 samples). The reviewer should be aware that MS/MSD are batch specific not sample specific.		
3.3.1	Is matrix spike/matrix spike duplicate recovery data present?	X
3.3.2	Were any VOC spike recoveries are outside the QC limits?	X
3.3.3	Check RPDs for matrix spike and matrix spike duplicate recoveries.	X
3.4	**Matrix Spike/Matrix Spike Duplicates, SVOC**	
3.4.1	Is matrix spike/matrix spike duplicate recovery data present?	--
3.4.2	Were any SVOC spike recoveries are outside the QC limits?	--
3.4.3	Check RPDs for matrix spike and matrix spike duplicate recoveries.	--
3.5	**Sample Specific**	
Metal Spike Recovery – Spikes are elements of known composition that are added to blanks and to samples that measure accuracy and precision of the analyses. At least one spike should be included for each batch of samples. Spike recovery criteria listed in this section are determined from U.S. EPA's National Functional Guidelines for Inorganic Data Review. The criteria applied by an individual laboratory may vary. The laboratory should be consulted and its QA/QC criteria supplied to the reviewer.		
3.5.1	Confirm that at least one spike sample was analyzed per batch and per matrix type.	--
3.5.2	Are all spike recoveries (except Hg and Ag) within control limits?	--
3.5.3	Based on the results of 3.5.2, if the sample results were <4x the spike amount and spike recoveries were out of criteria, a post-digestion spike should be analyzed. Note: Post-digestion spikes are not required for Ag or Hg. The post digestion spike confirms a matrix interference and should not be used for qualification.	--
3.5.4	Are any Aqueous spike recoveries (pre and post digestion): 1. Less than 30%? 2. Between 30% and 74%? 3. Between 126% and 150%? 4. Greater than 150%?	--
3.5.5	Are any soil/solid/waste spike recoveries (pre and post digestion): 1. Less than 10%? 2. Between 10% and 74%? 3. Between 126% and 200%? 4. Greater than 200%?	--
3.5.6	If the pre-digestion spike was outside the QC limits for Atomic Adsorption furnace analysis (e.g. SW-846 methods in the 7000 series), was a post-digestion spike performed?	--
3.5.7	Based on the results from 3.5.6, were the post-digestion spike recoveries within the	--

	quality control range (75% to 125%)?	
4.0	**Blank Data Review**	
Blank Data – Laboratory blanks are used to assess whether contamination from the laboratory, reagents or other samples exists and whether this contamination can bias sample results. The qualification of sample results will depend upon the magnitude of blank contamination.		
4.1	**Blank Summary Review – VOC**	
4.1.1	Is the method blank summary data present for each batch (method and matrix), including TCLP?	X
4.1.2	Is there an indication that the samples associated with that blank were diluted?	X
4.1.3	Check field/trip/rinsate blanks for any positive results for volatile target analytes.	X
4.1.4	Check method blanks for VOCs.	X
4.2	**Blank Summary Review – SVOC**	
4.2.1	Is the method blank summary data present for each batch (method and matrix), including TCLP?	--
4.2.2	Check for dilution associated with that blank.	--
4.2.3	Check field/trip/rinsate blanks for any positive results for semi-volatile target analytes.	--
4.2.4	Check method blanks for SVOCs.	--
4.3	**Blank Summary Review – Metals**	
4.3.1	Were the method blank summary data present for each batch (method and matrix), including TCLP?	--
4.3.2	Check for detections in blank.	--

APPENDIX II

LABORATORY ANALYTICAL REPORTS ON CD


EMD Millapore Corporation
Quarterly Progress Report - 4th Qtr. 2014
Appendix II: Laboratory Analytical Reports
TRC
Results you can rely on
Project No. 213083.0001
January 14, 2015

APPENDIX III

REMEDY COMPONENTS INSPECTION RECORDS

Lithko Restoration technologies

September 10, 2014

Dennis Taus **RE: Review of Exterior Joint Condition September 9th, 2014**
EMD Millipore

Dear Dennis,

Lithko Restoration Technologies agrees to supply all labor, materials and equipment to perform the following scope of work:

General Assessment: 12/4/14. The overall the condition of the lot and joints continues to be sound. However there are some areas that need to be monitored and considered for repair. The problem areas are listed below and photographs of the areas are also attached.

1) **There are approximately 25 cracks about 1 ft long all along the green trench drain that should be monitored and considered for repair. (picture attached)**
2) **Joint between 6.2 and 5.2 is beginning to deteriorate. Should be repaired near future. (Picture attached)**
3) **Joint in 6.2 near trench drain is deteriorating and should be repaired in very near future. Picture attached.**
4) **There is a 6 ft crack leading to the drain in 5.9 that should be monitored. (Picture attached**
5) **There is 3 linear ft of cracks in section 4.9 that should be monitored. (Picture attached)**
6) **There is 2-3 linear ft of cracks in section 5.3 near the edge of 4.2 that should be monitored. (picture attached)**
7) **There is 2 linear ft of cracks in section 6.1 at trench drain that should be monitored (picture attached)**
8) **There is a 1 linear ft crack in the back of 6.1 (corner) that should be repaired in the near future. (Picture attached)**
9) **There is a 4ft long by 6 inch wide area in 3.5 that needs to be patched in the near future. Picture attached.**
10) **There is a small amount of joint deterioration in section 3.2 that should be monitored. (Picture is attached)**
11) **There is a deteriorating joint line in section 2.3 that should be monitored. (Picture is attached)**
12) **There is a patch that has failed in section 2.3 that should be considered for repair in the near future. (Picture is attached)**
13) **There is a deteriorating joint in section 2.2 that should be monitored for future repair. (Picture is attached)**

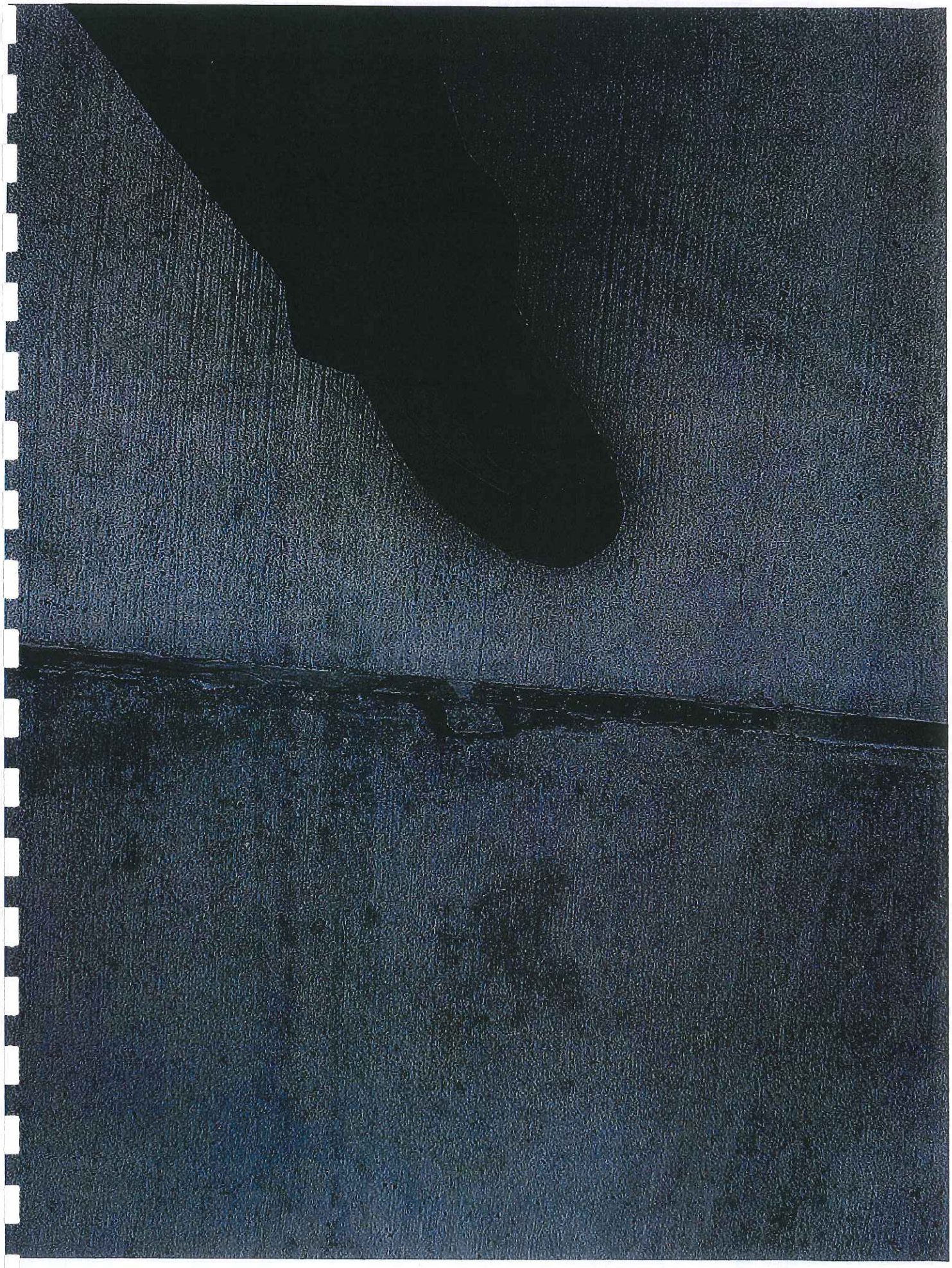
5375 Hamilton Middletown Road · Hamilton, OH 45011-2407 · Office 513.863.5500 · Fax 513.863.5580
1009-C McKinley Ave. · Columbus, OH 43222-1154 · Office 614.221.0711 · Fax 614.221.0769

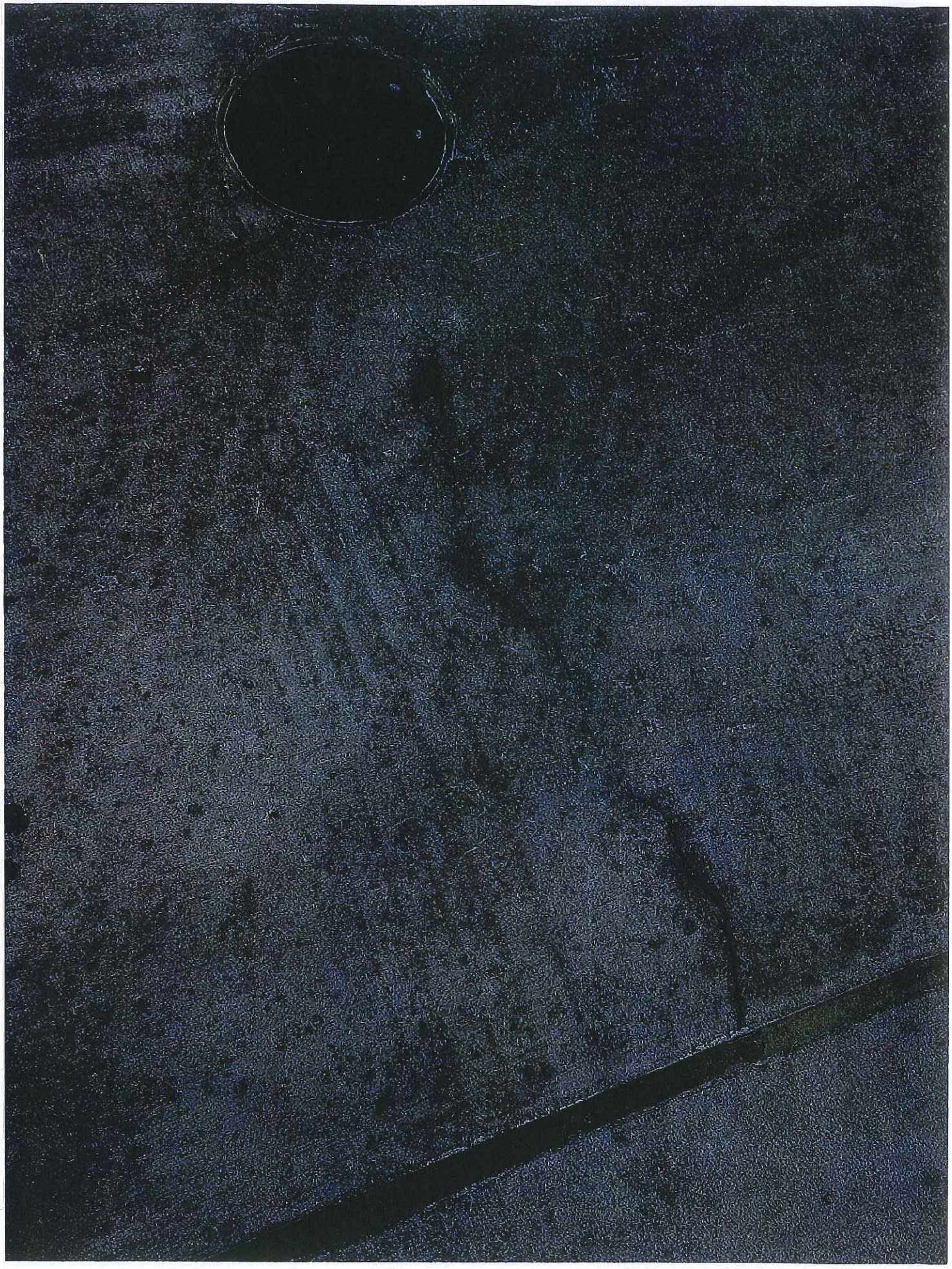
14) There is a failing patch that should be repaired in the near future in section2.2. (Picture is attached)

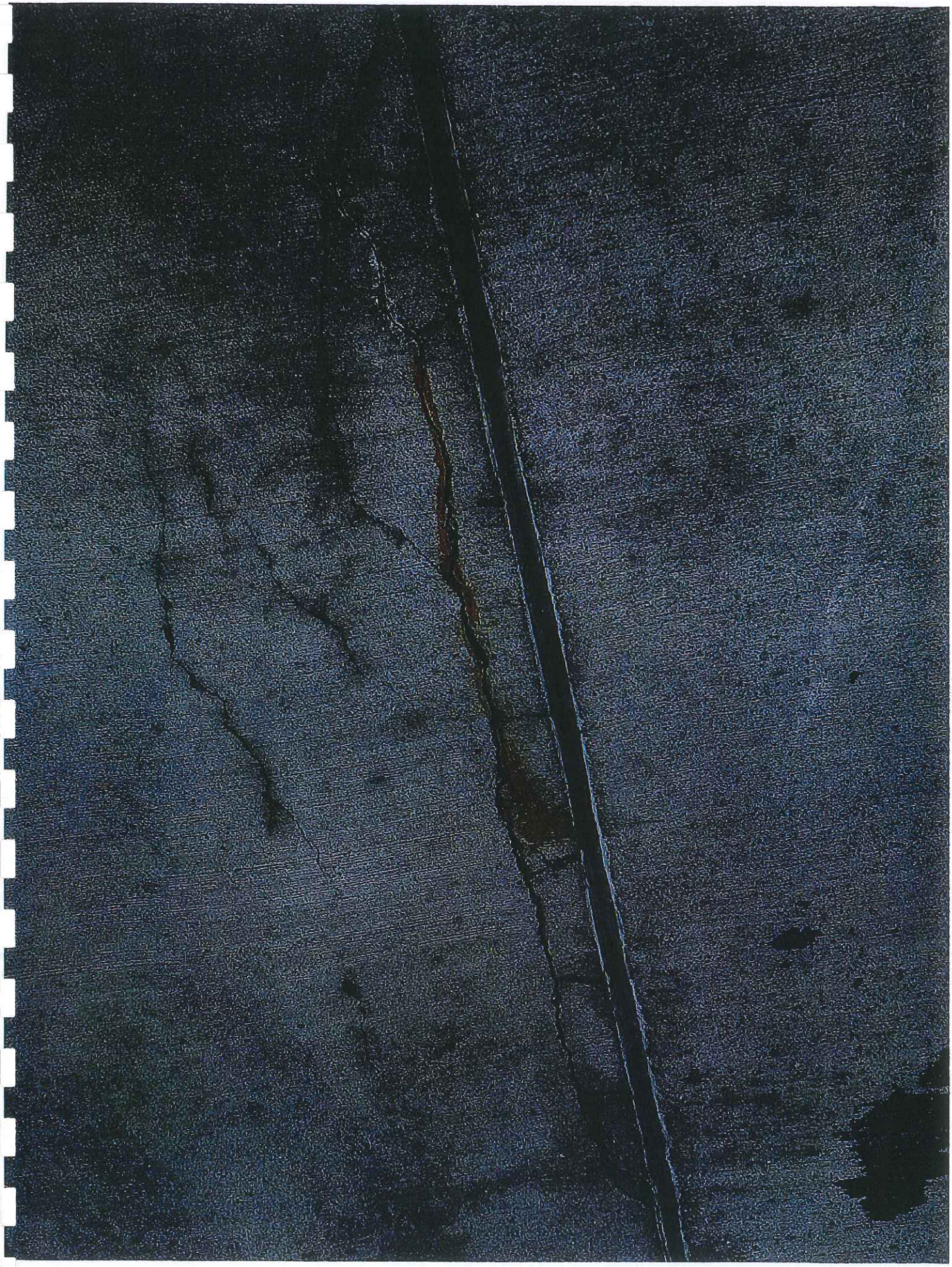
15) There is a failed patch in section 2.9 under the hose connection that should be repaired in the near future. (Picture attached)

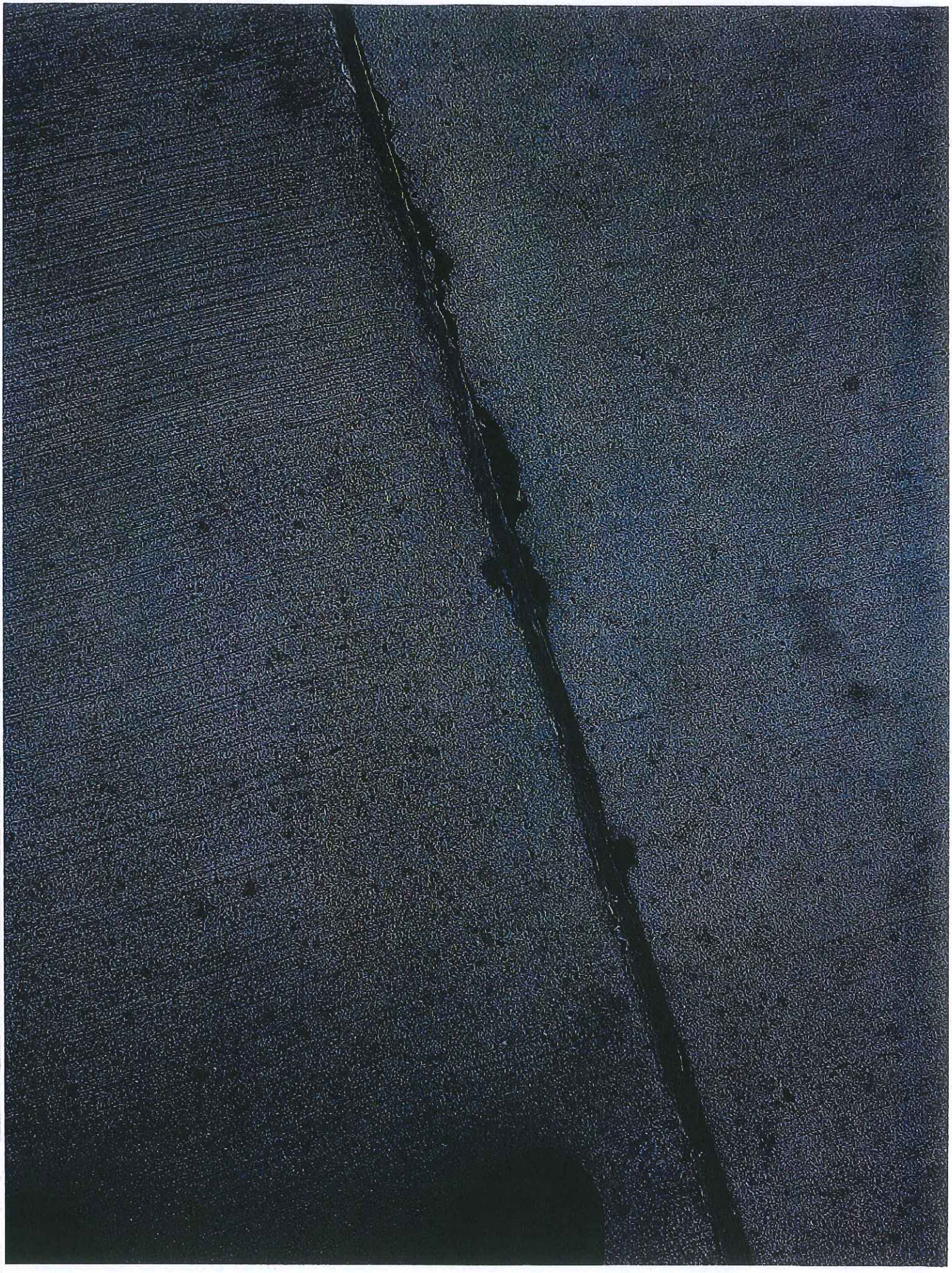
Collin Barber
Lithko Restoration Technologies
(513) 867-4332 Direct Office
(513) 603-0663 Mobile

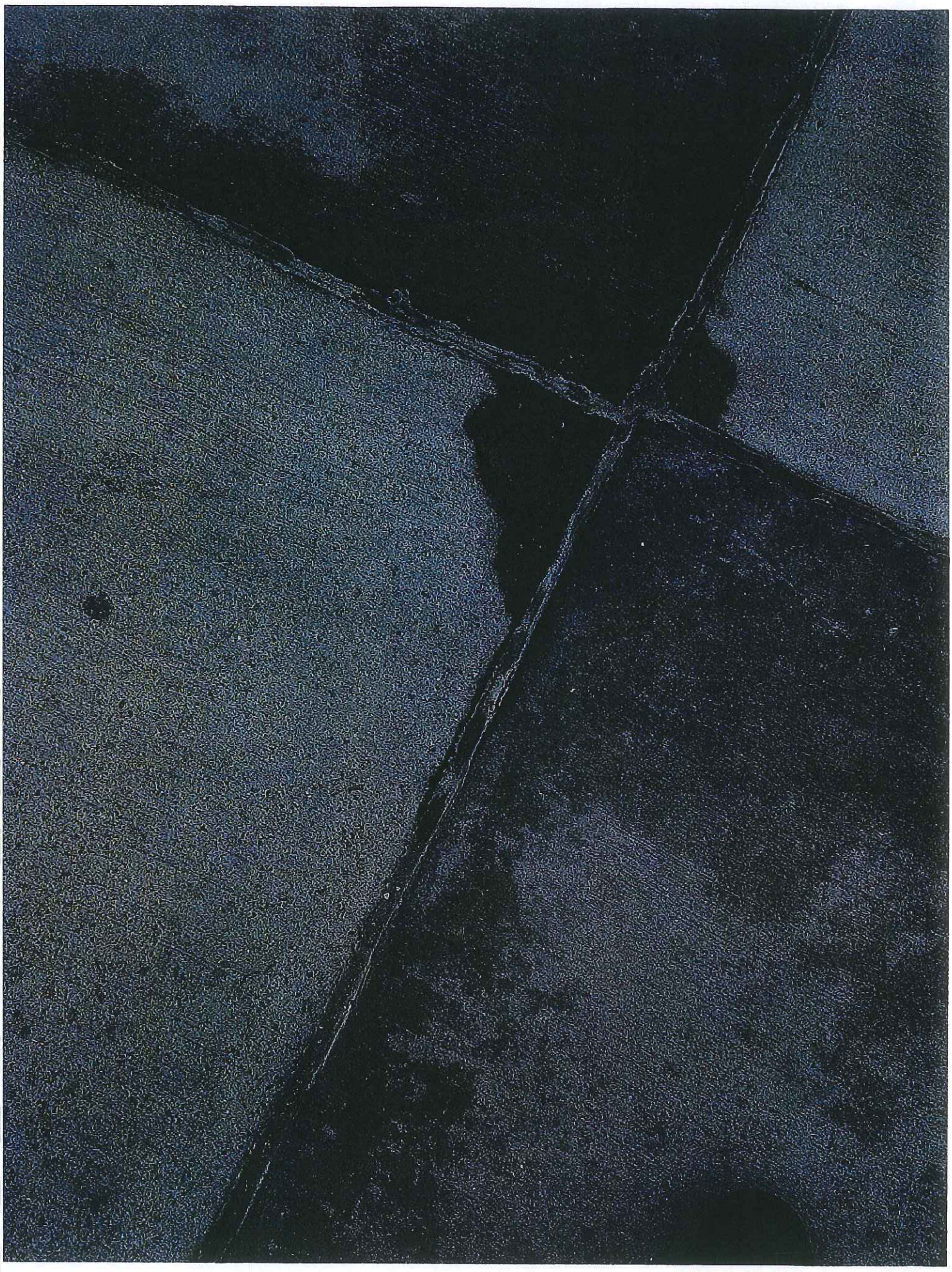

CHESTNUT FOUNDRY CO











APPENDIX IV

CRA INJECTION REPORT

CONESTOGA-ROVERS
& ASSOCIATES

9033 Meridian Way, West Chester, Ohio 45069
Telephone: (513) 942-4750 Facsimile: (513) 942-8585
www.CRAworld.com

November 12, 2014

Reference No. 085725

Mr. Jess Stottsberry
Class V Coordinator
UIC Program
Division of Drinking and Groundwaters
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216-1049

Dear Mr. Stottsberry:

Re: Report for Groundwater Performance Sampling
EMD Millipore Corporation
Norwood, Ohio

1.0 Introduction

On behalf of our client EMD Millipore Corporation (EMD), and in accordance with the Ohio Administrative Code (OAC) Rule 3745-34-11 (G), we are submitting the following information as part of the EMD October 2014 groundwater sampling event. The report presents information on the sampling and analysis of groundwater samples collected from monitoring wells at the EMD facility located at 2909 Highland Avenue in Norwood, Ohio. The injection of fluids into the Class V wells was authorized by Ohio EPA as part of the approval of the *The Work Plan for In Situ Chemical Oxidation, Former Tank Farm Area at EMD Millipore Corporation, Cincinnati, Ohio*. The October 2014 event was conducted between October 20, 2014 and October 22, 2014, and was the three month sampling event following the second chemical injection event at the former tank farm area at the EMD site.

The location of all injection and monitoring wells constructed as part of the in situ chemical oxidation and sampling activities on the EMD property are presented on Figure 1.

2.0 Well Purging and Sampling

Prior to sampling, each well was purged using a pre-cleaned low flow bladder pump with the pump intake positioned at the center of the well screen. Purging was conducted at a maximum rate of 400 milliliters per minute until stabilized conditions of pH, temperature, conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP) and turbidity were observed. The stabilization data are presented in Table 1. All groundwater collected from purging activities

was transferred to an on-site orange painted manhole for treatment in the on-site treatment system.

The pumps were set a minimum of 12 hours prior to sampling activities. The static water level was measured and recorded at each well immediately prior to the start of purging. The water level was then measured at generally 5 to 10-minute intervals to monitor drawdown of the water column during purging. Immediately following stabilization, the wells were sampled using the low flow bladder pump and dedicated Teflon tubing.

Table 1 contains a summary of water levels & field notes recorded on October 21, 2014, prior to the start of the October 2014 sampling event. Groundwater samples were collected from all monitoring wells except MW-1A, MW-3A, and MW-4A, each of which had less than 0.1 feet of groundwater present. Groundwater samples were not field filtered. The water levels recorded during the October 2014 sampling event are presented in Table 2.

3.0 Sample Analysis

Groundwater samples collected were sent to the Test America laboratory in Canton, Ohio using standard chain of custody protocols. Groundwater samples were analyzed for volatile organic compounds (VOCs), 1,4-dioxane (using VOC and SVOC methods), iron, chloride, total organic carbon and sulfates. Prior to sampling each monitoring well, the presence of persulfate was checked for using a CHEMetric field kit. During the sampling event, a field duplicate, a MS/MSD and a trip blank were collected and sent to Test America laboratory. The results of the data verification and validation procedure indicate the groundwater data reported for the October 2014 sampling round are suitable for their intended use. The data validation memo for the groundwater sampling event is presented in Attachment A.

4.0 Analytical Results

The analytical results from the October 2014 sampling event, including historic analytical results are presented in Table 3.

The VOCs detected in at least one groundwater sample include:

VOC	Frequency of Detection	Concentrations Range (µg/L)	Federal MCL Standard (µg/L)
1,2-DCA	6/6	7 J to 16,000	5
Acetone	2/6	330 to 360	--
Benzene	6/6	32 J to 23,000	5
Chloroform	4/6	92 to 160,000	--
cis-1,2-DCE	5/6	19 J to 65,000	70
Ethylbenzene	4/6	71 to 5,700	700
Methylene Chloride	3/6	9.7 J to 35,000	--
PCE	3/6	41 J to 18,000	5
Toluene	4/6	100 to 35,000	1000
Trans-1,2-DCE	1/6	22 J	100
TCE	4/6	99 to 76,000	5
Vinyl Chloride	2/6	110 to 2,100 J	2
Xylenes	4/6	76 J to 21,000	10,000
1,4-Dioxane (SVOC)	5/6	99 to 14,000	--

J – Estimated concentration.

As indicated above, the VOCs that were detected at concentrations above a federal MCL in one or more samples include 1,2-DCA, Benzene, cis-1,2-DCE, Ethylbenzene, PCE, toluene, TCE, Vinyl Chloride, and Xylenes.

The analytical report includes a number of VOCs (e.g. 1,4-Dioxane) that were reported as non-detect at a high reporting limit as a result of matrix interference due to elevated VOC concentrations in groundwater samples.

Using the CHEMetric field kit, the presence of persulfate above 1 ppm was recorded in monitoring well MW-3B (> 70 ppm) and monitoring well MW-4B (2.8 ppm).

Iron was detected in all groundwater samples collected ranging in concentration from 0.31 mg/L to 27 mg/L. Chloride was detected in all groundwater samples collected ranging in concentration from 24 mg/L to 590 mg/L. Sulfate was detected in all groundwater samples collected ranging in concentration from 190 mg/L to 5,700 mg/L. Total Organic Carbon (TOC) was detected in all samples ranging from 3.6 mg/L to 83 mg/L.

CONESTOGA-ROVERS & ASSOCIATES

5.0 Future Sampling

Post chemical injection groundwater sampling and analysis is next scheduled to be conducted at eight former tank farm area monitoring wells in January 2015, six months following the July 2014 chemical injection event.

Should you have any questions on the above please do not hesitate to contact our office.

Yours truly,

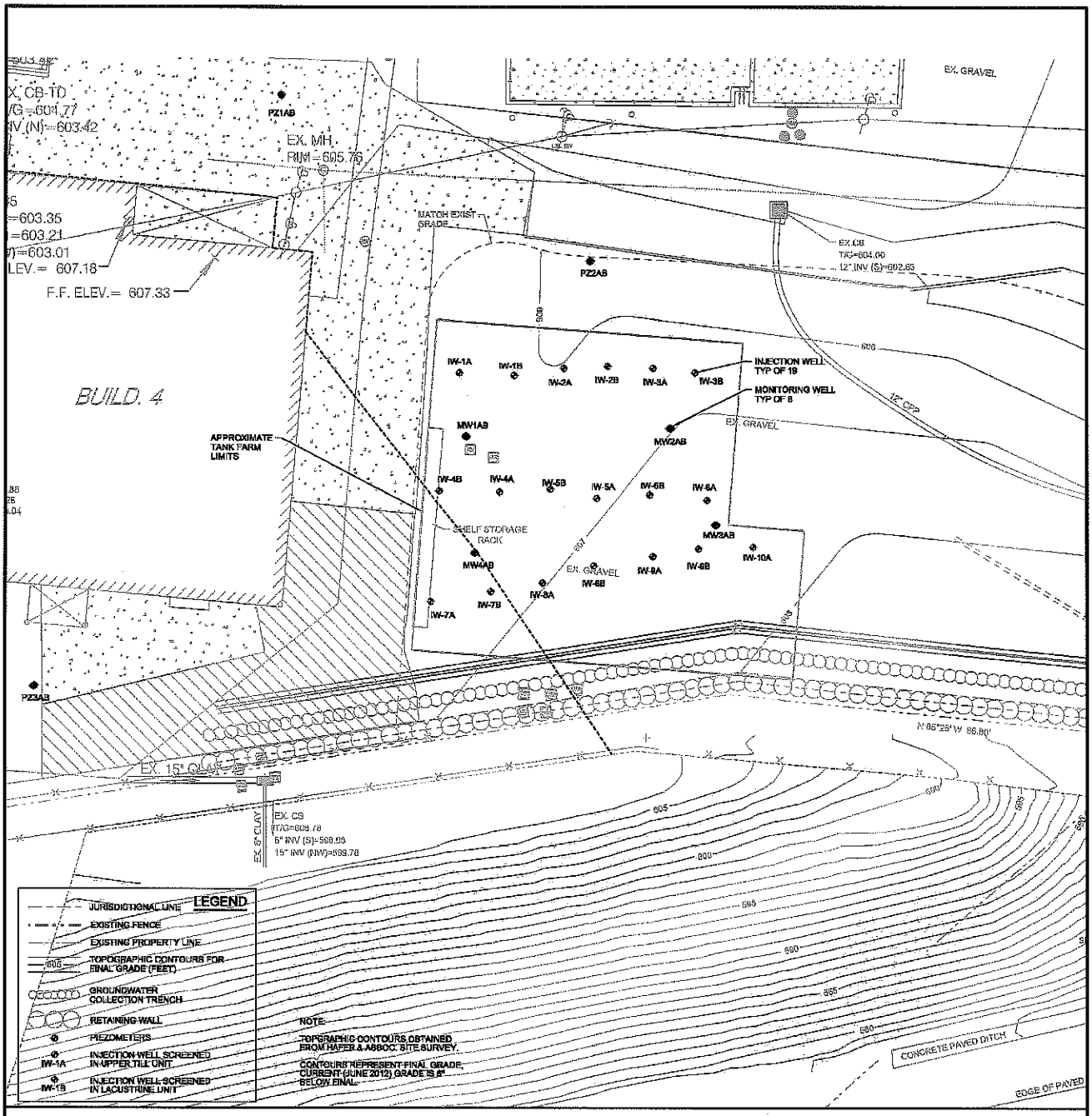
CONESTOGA-ROVERS & ASSOCIATES

Henry Cooke

HC/po/2
Encl.

cc.: Scott Chase (EMD)
Dennis Taus (EMD)

Figures



SOURCE: CH2MHILL, TANK FARM SITE PLAN, AS-BUILT LOCATIONS, EMD CHEMICALS, NORWOOD, OHIO, JANUARY 2013.

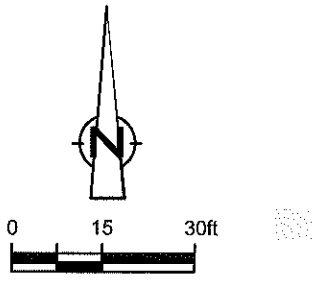


figure 1

MONITORING AND INJECTION WELL LAYOUT
EMD MILLIPORE CORPORATION
Norwood, Ohio

85725-01(STOT001)GN-WA001 AUG 6/2014

Tables

TABLE 1
ROUND 40 STABILIZATION DATA
EMD MILLIPORE CORPORATION
NORWOOD, OH

Monitoring Well ID	Date Purged/ Sampled	Time	Pumping Rate (mL/min)	Depth to Water (ft)	Drawdown from Initial Water Level (ft)	pH	Conductivity (mS/cm)	Temperature (° C)	Temperature (° F)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)
MW-1B	10/21/2014	13:20	200	37.62	6.05	7.04	0.986	16.91	62.44	2.38	-21.2	24.0
		13:30	200	37.70	6.13	7.05	0.980	17.27	63.09	2.49	-20.1	15.4
		13:40	150	38.92	7.35	7.07	0.979	17.22	63.00	3.33	-16.2	14.80
		13:50	150	40.97	9.40	7.07	0.979	17.28	63.10	3.46	-10.3	13.40
		14:00	150	41.48	9.91	7.07	0.980	17.33	63.19	3.41	-6.6	11.50
		14:10	150	TOP	N/A	7.07	0.981	17.36	63.25	3.44	-5.4	10.90
MW-2B	10/21/2014	15:35	150	36.32	4.75	6.82	9.264	18.24	64.83	0.03	-71.8	150.0
		15:45	150	37.74	2.65	6.71	9.110	18.21	64.78	0.02	-72.0	101.0
		15:55	150	38.57	3.48	6.70	9.077	18.29	64.92	0.02	-71.7	59.50
		16:05	150	39.34	4.25	6.68	9.042	18.55	65.39	0.02	-62.7	46.10
		16:15	150	39.75	4.66	6.67	9.033	18.69	65.64	0.01	-58.4	37.20
		16:25	150	40.77	5.68	6.67	9.012	18.23	64.81	0.02	-58.5	39.30
		16:35	150	41.73	6.64	6.65	8.950	18.12	64.62	0.02	-58.9	29.80
		16:45	150	42.37	7.28	6.65	8.944	18.21	64.78	0.02	-58.1	30.30
		16:55	150	TOP	N/A	6.65	8.951	18.18	64.72	0.01	-57.7	30.90
MW-3B	10/22/2014	9:25	150	39.12	2.03	6.80	9.913	17.80	64.04	2.06	215.1	633.0
		9:30	150	39.73	2.64	6.77	9.225	17.96	64.33	1.83	240.6	399.0
		9:35	150	40.27	3.18	6.76	8.814	18.13	64.63	1.72	247.8	266.0
		9:40	150	40.68	3.59	6.75	8.574	18.30	64.94	1.59	251.3	156.00
		9:45	150	41.16	4.07	6.74	8.336	18.32	64.98	1.57	254.3	97.50
		9:50	150	41.50	4.41	6.74	8.211	18.40	65.12	1.58	255.4	68.00
		9:55	150	41.81	4.72	6.74	8.144	18.29	64.92	1.63	256.0	56.10
		10:00	150	42.01	4.92	6.74	8.102	18.24	64.83	1.64	256.4	43.00
		10:05	150	42.36	5.27	6.74	8.079	18.31	64.96	1.65	256.2	39.80
MW-4B	10/22/2014	11:20	150	36.04	1.62	6.84	1.530	17.68	63.82	3.22	167.9	74.0
		11:25	150	37.08	2.66	6.83	1.423	17.26	63.07	2.55	142.1	27.3
		11:30	150	37.76	3.34	6.83	1.404	17.14	62.85	2.28	132.8	18.4
		11:35	150	38.20	3.78	6.84	1.392	17.17	62.91	2.36	125.1	12.2
		11:40	150	38.88	4.46	6.86	1.383	17.31	63.16	2.75	121.6	10.20
		11:45	150	39.45	5.03	6.88	1.378	17.40	63.32	3.45	116.5	7.40

TABLE 1
ROUND 40 STABILIZATION DATA
EMD MILLIPORE CORPORATION
NORWOOD, OH

Monitoring Well ID	Date Purged/ Sampled	Time	Pumping Rate (mL/min)	Depth to Water (ft)	Drawdown from Initial Water Level (ft)	pH	Conductivity (mS/cm)	Temperature (° C)	Temperature (° F)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)
		11:50	150	40.00	5.58	6.91	1.373	17.51	63.52	4.21	113.7	5.88
		11:55	150	40.54	6.12	6.94	1.370	17.56	63.61	5.34	111.7	4.57
		12:00	150	41.14	6.72	6.97	1.370	17.24	63.03	5.67	108.5	4.34
		12:05	150	41.69	7.27	6.97	1.370	17.17	62.91	5.71	107.3	3.40
		12:10	150	42.06	7.64	6.97	1.369	17.25	63.05	5.74	106.8	3.31
MW-2A	10/22/2014	13:45	100	24.85	0.62	6.64	12.410	19.27	66.69	0.05	-49.0	353.0
		13:50	100	24.90	0.67	6.64	12.420	19.36	66.85	0.04	-53.6	330.0
		13:55	100	24.94	0.71	6.64	12.450	19.35	66.83	0.02	-57.8	275.0
		14:00	100	TOP	N/A	6.63	12.450	19.51	67.12	0.03	-60.6	307.0
		14:05	100	TOP	N/A	6.63	12.460	19.58	67.24	0.02	-63.1	319.0

Notes:
TOP- Top of Pump

TABLE 2

WATER LEVELS
EMD MILLIPORE CORPORATION
NORWOOD, OH

Well D	TOC Elevation (ft amsl)	Depth to Water October 21, 2014 (ft btc)	Water Level October 21, 2014 (ft amsl)
MW-1A	605.360	Dry	N/A
MW-1B	605.373	31.57	573.803
MW-2A	606.069	24.23	581.839
MW-2B	606.066	35.09	570.976
MW-3A	606.362	Dry	N/A
MW-3B	606.371	37.09	569.281
MW-4A	605.804	Dry	N/A
MW-4B	605.834	34.42	571.414

Notes:

MW	monitoring well
ft btc	feet below top of casing
TOC	top of casing
ft amsl	feet above mean sea level
N/A	not applicable

Table 3
Groundwater Monitoring Analytical Results
EMD Millipore Corporation
Norwood, Ohio

Analyte	Well:	MW-1A		MW-1B				MW-2A				MW-2B				MW-3B				MW-4B			
	Date:	3/14/2013	10/30/2013	3/12/2013	8/1/2013	10/30/2013	10/21/2014	3/14/2013	7/31/2013	10/29/2013	10/22/2014	3/14/2013	7/31/2013	10/29/2013	10/22/2014	3/15/2013	7/31/2013	10/29/2013	10/22/2014	3/14/2013	8/1/2013	10/30/2013	10/22/2014
	Units																						
1,1,1-Trichloroethane	ug/L	2,500	8,500	8,330	1,480	700	ND	ND	31.6	300	ND	ND	ND	6	ND	21.2	ND	ND	ND	3,540	1,050	1,200	ND
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	ND	2.71	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND	ND	11.9	ND	ND
1,1,2-Trichloroethane	ug/L	ND	ND	ND	22.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	37.6	ND	ND
1,1-Dichloroethane	ug/L	268	940 J	ND	246	200 J	ND	133	126	350	ND	ND	5.82	10	ND	5.74	ND	ND	ND	ND	127	260 J	ND
1,1-Dichloroethene	ug/L	ND	ND	ND	23.6	ND	ND	ND	24.3	80	ND	ND	1.21	1 J	ND	1.32	ND	ND	ND	ND	17.7	ND	ND
1,1-Dichloropropene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/L	ND	ND	ND	3.84	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.53	ND	ND
1,2-Dichloroethane	ug/L	99,800	130,000	47,500	11,300	6,300	4,300	ND	85.3	2,700	1,400 J	250	75.4	33	51	302	11	8	7.2 J	68,300	29,900	30,000	16,000
2-Butanone (MEK)	ug/L	ND	3,300 J	ND	ND	ND	ND	ND	ND	530	ND	ND	ND	ND	ND	75.8	ND	9 J	ND	ND	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	ug/L	1,570	ND	ND	164	ND	ND	ND	108	92 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	940	990 J	ND
Acetone	ug/L	38,500	40,000	ND	52.5	ND	ND	ND	240	1,300	ND	ND	ND	ND	ND	299	907	360	360	ND	321	ND	ND
Benzene	ug/L	98,100	96,000	53,500	13,800	7,500	5,500	4,190	4,300	17,000	6,400	861	185	220	170	284	18.3	14	33	83,600	30,700	41,000	23,000
Carbon disulfide	ug/L	ND	ND	ND	46.9	ND	ND	ND	2.81	ND	ND	ND	1.18	ND	ND	1.44	5.33	13	13 JB	ND	104	ND	ND
Carbon tetrachloride	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/L	ND	ND	ND	13	ND	ND	ND	2.93	9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.74	ND	ND
Chlorodibromomethane/Dibromochlord	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/L	501,000	580,000	307,000	68,900	27,000	13,000	183	26.8	54,000	3,500	722	130	290	92	1,420	30	7	ND	952,000	325,000	320,000	160,000
Chloromethane	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.86	ND	ND	ND	4.39	ND	ND
cis-1,2-Dichloroethene	ug/L	5,180	15,000	ND	295	210 J	2,100 J	11,400	14,800	58,000	65,000	5,860	1,970	700	1,300	308	8.74	35	20 J	1,370	528	600 J	ND
Dichlorodifluoromethane	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/L	4,420	6,900	7,530	2,150	1,600	1,800 J	5,120	6,760	4,000	1,100 J	756	161	99	71	59.7	3.32	2 J	ND	12,500	8,890	11,000	5,700
Hexachlorobutadiene	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/L	ND	ND	ND	32.3	ND	ND	ND	80.2	53	ND	ND	1.63	2 J	ND	ND	ND	ND	ND	ND	92.1	ND	ND
Methyl tert-butyl ether	ug/L	165	460 J	ND	ND	ND	ND	ND	138	110	ND	ND	5.14	4 J	ND	2.71	ND	ND	ND	ND	13.7	ND	ND
Methylene Chloride	ug/L	224,000	190,000	33,900	11,500	7,000	6,000	622	5.48	3,800	ND	ND	26.8	6	ND	262	12.3	4 J	9.7 J	115,000	62,400	58,000	35,000
Tetrachloroethene	ug/L	4,040	11,000	16,400	3,570	3,100	3,600	ND	19.2	3,600	ND	124	12.9	35	41 J	140	9.1	5 J	ND	49,500	23,200	31,000	18,000
Toluene	ug/L	150,000	99,000	86,400	18,700	15,000	16,000	19,900	15,200	24,000	12,000	1,690	87.4	62	100	347	24.7	7	ND	79,800	38300	53,000	35,000
trans-1,2-Dichloroethene	ug/L	ND	ND	ND	14.9	ND	ND	ND	107	270	ND	ND	48.2	9	22 J	7.32	1.05	4 J	ND	ND	22.9	ND	ND
Trichloroethene	ug/L	226,000	140,000	596,000	122,000	87,000	76,000	330	37.2	14,000	750 J	2,220	135	67	99	1,530	15.3	12	ND	122,000	45,400	57,000	38,000
Vinyl chloride	ug/L	ND	ND	ND	6.82	ND	ND	ND	3,970	2,100	2,100 J	932	132	94	110	35.1	ND	4 J	ND	ND	13.4	ND	ND
Xylenes, Total	ug/L	18,500	27,000	31,100	8,310	6,500	8,000	18,800	20,600	13,000	5,600 J	3,210	579	50	76 J	219	9.96	4 J	ND	45,000	28,600	36,000	21,000
Iron	mg/L	4	NA	NA	NA	NA	2.6 B	15.8	NA	NA	27 B	23.7	NA	NA	26 B	NA	NA	NA	8.6 B	158	NA	NA	0.31 b
1,4-Dioxane (SVOC)	ug/L	45,200 B *	NA	75.5	21.9	35	ND	ND	3,940	13,000	14,000	357 B *	249	420	99	248 B *	42.3	520	320	853 B *	462	1,100	190
1,4-Dioxane (VOC)	ug/L	85,000	NA	NA	ND	NA	ND	ND	NA	NA	ND	NA	1,100	NA	ND	NA	280	NA	ND	NA	2,940	NA	ND
Chloride	mg/L	600	NA	24.1	21	NA	24	152	232	NA	590	41.6	27.4	NA	29	34.9	140	NA	32	76.8	69.7	NA	95
Total Organic Carbon	mg/L	680	NA	5.6	6.04	13.3	3.6	14.5	48.2	51.4	83	5.38	2.78	2.6	6.6	2.66	28.7	15.9	5.8	14.9	10.8	9.7	4.9
Sulfate	mg/L	NA	NA	NA	167	195	190	NA	1,010	523	5,700	NA	452	161	4,300	NA	20,300	11,600	4,100	NA	197	175	250

Notes

NA - not applicable

ND - not detected

B - compound detected in blank

J - Analyte present but is estimated. It may or may not be accurate or precise.

* value estimated due to exceeded holding times

Attachment A

CONESTOGA-ROVERS & ASSOCIATES

9033 Meridian Way, West Chester, OH 45069
Telephone: 513-942-4750 Fax: 513-942-8585
www.CRAworld.com

MEMORANDUM

TO:	Henry Cooke	REF. NO.:	085725
FROM:	Angela Bown/bjw/1-NF	DATE:	November 11, 2014
RE:	**Analytical Results and Reduced Validation Monitoring Well Sampling EMD Millipore Corporation Norwood, Ohio October 2014**		

1.0 Introduction

The following document details a reduced validation of analytical results for groundwater samples collected in support of the Monitoring Well Sampling Program at the EMD Millipore Site during October 2014. Samples were submitted to TestAmerica Laboratories, Inc. (TestAmerica) located in North Canton, Ohio. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard Conestoga-Rovers & Associates (CRA) report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spikes (MS), and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", United States Environmental Protection Agency (USEPA) 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2.0 Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3.0 Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation, with the exception of carbon disulfide and iron. Table 4 presents the sample results that were qualified due to analyte concentrations in the method blanks.

4.0 Surrogate Spike Recoveries - Organic Analyses

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for organic determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. Most surrogate recoveries met the above criteria. High surrogate recoveries were reported for sample GW-85725-102214-GL-006 for SVOC analysis due to a necessary dilution (200 times) to successfully analyze the sample. Associated sample results were not impacted.

5.0 Laboratory Control Sample Analyses

LCSs are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

For this study, LCSs were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The LCSs contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the extraction or digestion process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

If only the MS or MSD recovery was outside of control limits, no qualification of the data was performed based on the acceptable recovery of the companion spike and the acceptable RPD.

Non-detect sample results associated with high MS/MSD recoveries or RPDs were not qualified. Non-detect data would not be impacted by the indicated high bias/variability.

MS/MSD analyses were performed as specified in Table 1.

Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries and RPD values were within the control limits or did not warrant qualification, demonstrating acceptable analytical accuracy and precision.

7.0 Field QA/QC Samples

The field QA/QC consisted of one (1) trip blank sample, one (1) rinse blank sample, and one (1) field duplicate sample set.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, 1 trip blank was submitted to the laboratory for volatile organic compound (VOC) analysis. All results were non-detect for the compounds of interest with the exception of carbon disulfide. Investigative samples were previously qualified for method blank contamination of carbon disulfide and further qualification was not necessary.

Rinse Blank Sample Analysis

To assess field decontamination procedures, ambient conditions at the Site, and cleanliness of sample containers, a rinse blank was submitted for analysis, as identified in Table 1. Sulfate, iron, and total organic carbon (TOC) were detected in the rinse blank sample. All associated sample results were either non-detect for the analytes of interest or were significantly greater than the blank result and did not warrant qualification.

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the practical quantitation limit (PQL), the evaluation criterion is one times the PQL value for water samples.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision with the exception of iron. Table 5 presents the qualified sample results.

8.0 Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the PQL but greater than the MDL were qualified as

estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the PQL in Table 2.

9.0 Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

TABLE 1

SAMPLE COLLECTION AND ANALYSIS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

					Analysis/Parameters						
Sample Identification	*Location*	*Matrix*	*Collection Date (mm/dd/yyyy)*	*Collection Time (hr:min)*	*VOCs*	*Select SVOCs*	*Iron*	*Chloride*	*Sulfate*	*TOC*	*Comments*
TestAmerica Job Number: 240-43438-1											
GW-85725-102114-GL-001	MW-1B	WG	10/21/2014	2:12:00 PM	X	X	X	X	X	X	MS/MSD
GW-85725-102114-GL-002	MW-2B	WG	10/21/2014	5:00:00 PM	X	X	X	X	X	X	
GW-85725-102214-GL-003	MW-3B	WG	10/22/2014	10:08:00 AM	X	X	X	X	X	X	
GW-85725-102214-GL-004	MW-3B	WG	10/22/2014	10:25:00 AM	X	X	X	X	X	X	GW-85725-102214-GL-003
GW-85725-102214-GL-005	MW-4B	WG	10/22/2014	12:13:00 PM	X	X	X	X	X	X	
GW-85725-102214-GL-006	MW-2A	WG	10/22/2014	2:10:00 PM	X	X	X	X	X	X	
GW-85725-102214-GL-007	FIELD BLANK	WGQ	10/22/2014	4:50:00 PM	X	X	X	X	X	X	
TRIPBLANK-102214-001	TRIP BLANK	WGQ	10/22/2014	-	X						

Notes:

MS - Matrix Spike
MSD - Matrix Spike Duplicate
SVOCs - Semi-Volatile Organic Compounds
TOC - Total Organic Carbon
VOCs - Volatile Organic Compounds

TABLE 2

ANALYTICAL RESULTS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	***MW-1B***	***MW-2A***	***MW-2B***
	Sample ID:	***GW-85725-102114-GL-001***	***GW-85725-102214-GL-006***	***GW-85725-102114-GL-002***
	Sample Date:	***10/21/2014***	***10/22/2014***	***10/21/2014***
Parameters	***Units***			
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	3300 U	3300 U	50 U
1,1,2,2-Tetrachloroethane	µg/L	3300 U	3300 U	50 U
1,1,2-Trichloroethane	µg/L	3300 U	3300 U	50 U
1,1-Dichloroethane	µg/L	3300 U	3300 U	50 U
1,1-Dichloroethene	µg/L	3300 U	3300 U	50 U
1,1-Dichloropropene	µg/L	3300 U	3300 U	50 U
1,2-Dichlorobenzene	µg/L	3300 U	3300 U	50 U
1,2-Dichloroethane	µg/L	4300	1400 J	51
1,4-Dioxane	µg/L	170000 U	170000 U	2500 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	33000 U	33000 U	500 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	33000 U	33000 U	500 U
Acetone	µg/L	33000 U	33000 U	500 U
Benzene	µg/L	5500	6400	170
Carbon disulfide	µg/L	3300 U	1700 U	50 U
Carbon tetrachloride	µg/L	3300 U	3300 U	50 U
Chlorobenzene	µg/L	3300 U	3300 U	50 U
Chloroethane	µg/L	3300 U	3300 U	50 U
Chloroform (Trichloromethane)	µg/L	13000	3500	92
Chloromethane (Methyl chloride)	µg/L	3300 U	3300 U	50 U
cis-1,2-Dichloroethene	µg/L	2100 J	65000	1300
Dibromochloromethane	µg/L	3300 U	3300 U	50 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	*MW-1B*	*MW-2A*	*MW-2B*
	Sample ID:	*GW-85725-102114-GL-001*	*GW-85725-102214-GL-006*	*GW-85725-102114-GL-002*
	Sample Date:	*10/21/2014*	*10/22/2014*	*10/21/2014*
Parameters	***Units***			
Volatile Organic Compounds (Continued)				
Dichlorodifluoromethane (CFC-12)	µg/L	3300 U	3300 U	50 U
Ethylbenzene	µg/L	1800 J	1100 J	71
Isopropyl benzene	µg/L	3300 U	3300 U	50 U
Methyl tert butyl ether (MTBE)	µg/L	3300 U	3300 U	50 U
Methylene chloride	µg/L	6000	3300 U	50 U
Tetrachloroethene	µg/L	3600	3300 U	41 J
Toluene	µg/L	16000	12000	100
trans-1,2-Dichloroethene	µg/L	3300 U	3300 U	22 J
Trichloroethene	µg/L	76000	750 J	99
Vinyl chloride	µg/L	3300 U	2100 J	110
Xylenes (total)	µg/L	8000	5600 J	76 J
Semi-volatile Organic Compounds				
1,4-Dioxane	µg/L	11 U	14000	99
Hexachlorobutadiene	µg/L	11 U	800 U	5.1 U
Metals				
Iron	µg/L	2600	27000	26000

TABLE 2

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MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	*MW-1B*	*MW-2A*	*MW-2B*
	Sample ID:	*GW-85725-102114-GL-001*	*GW-85725-102214-GL-006*	*GW-85725-102114-GL-002*
	Sample Date:	*10/21/2014*	*10/22/2014*	*10/21/2014*
Parameters	***Units***			
General Chemistry				
Chloride	mg/L	24	590	29
Sulfate	mg/L	190	5700	4300
Total organic carbon (TOC)	mg/L	3.6	83	6.6

TABLE 2

ANALYTICAL RESULTS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	***MW-3B***	***MW-3B***	***MW-4B***
	Sample ID:	***GW-85725-102214-GL-003***	***GW-85725-102214-GL-004***	***GW-85725-102214-GL-005***
	Sample Date:	***10/22/2014***	***10/22/2014***	***10/22/2014***
Parameters	***Units***			
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	33 U	33 U	5000 U
1,1,2,2-Tetrachloroethane	µg/L	33 U	33 U	5000 U
1,1,2-Trichloroethane	µg/L	33 U	33 U	5000 U
1,1-Dichloroethane	µg/L	33 U	33 U	5000 U
1,1-Dichloroethene	µg/L	33 U	33 U	5000 U
1,1-Dichloropropene	µg/L	33 U	33 U	5000 U
1,2-Dichlorobenzene	µg/L	33 U	33 U	5000 U
1,2-Dichloroethane	µg/L	7.2 J	7.0 J	16000
1,4-Dioxane	µg/L	1700 U	1700 U	250000 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	330 U	330 U	50000 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	330 U	330 U	50000 U
Acetone	µg/L	360	330	50000 U
Benzene	µg/L	33	32 J	23000
Carbon disulfide	µg/L	33 U	33 U	5000 U
Carbon tetrachloride	µg/L	33 U	33 U	5000 U
Chlorobenzene	µg/L	33 U	33 U	5000 U
Chloroethane	µg/L	33 U	33 U	5000 U
Chloroform (Trichloromethane)	µg/L	33 U	33 U	160000
Chloromethane (Methyl chloride)	µg/L	33 U	33 U	5000 U
cis-1,2-Dichloroethene	µg/L	20 J	19 J	5000 U
Dibromochloromethane	µg/L	33 U	33 U	5000 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	*MW-3B*	*MW-3B*	*MW-4B*
	Sample ID:	*GW-85725-102214-GL-003*	*GW-85725-102214-GL-004*	*GW-85725-102214-GL-005*
	Sample Date:	*10/22/2014*	*10/22/2014*	*10/22/2014*
Parameters	***Units***			
Volatile Organic Compounds (Continued)				
Dichlorodifluoromethane (CFC-12)	µg/L	33 U	33 U	5000 U
Ethylbenzene	µg/L	33 U	33 U	5700
Isopropyl benzene	µg/L	33 U	33 U	5000 U
Methyl tert butyl ether (MTBE)	µg/L	33 U	33 U	5000 U
Methylene chloride	µg/L	9.7 J	33 U	35000
Tetrachloroethene	µg/L	33 U	33 U	18000
Toluene	µg/L	33 U	33 U	35000
trans-1,2-Dichloroethene	µg/L	33 U	33 U	5000 U
Trichloroethene	µg/L	33 U	33 U	38000
Vinyl chloride	µg/L	33 U	33 U	5000 U
Xylenes (total)	µg/L	67 U	67 U	21000
Semi-volatile Organic Compounds				
1,4-Dioxane	µg/L	280	320	190
Hexachlorobutadiene	µg/L	10 U	10 U	10 U
Metals				
Iron	µg/L	8600 J	5100 J	310

TABLE 2

ANALYTICAL RESULTS SUMMARY
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

	Sample Location:	***MW-3B***	***MW-3B***	***MW-4B***
	Sample ID:	***GW-85725-102214-GL-003***	***GW-85725-102214-GL-004***	***GW-85725-102214-GL-005***
	Sample Date:	***10/22/2014***	***10/22/2014***	***10/22/2014***
Parameters	***Units***			
General Chemistry				
Chloride	mg/L	32	32	95
Sulfate	mg/L	3900	4100	250
Total organic carbon (TOC)	mg/L	5.7	5.8	4.9

Notes:

J - Estimated concentration.
U - Not detected at the associated reporting limit.

TABLE 3

ANALYTICAL METHODS AND HOLDING TIME CRITERIA
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

Parameter	*Method*	*Matrix*	*Preservation*	*Holding Time*	
				Collection to Extraction (Days)	*Collection or Extraction to Analysis (Days)*
VOCs	SW-846 8260B [1]	Water	Cool to 0-6° C HCl to pH<2	-	14
Select SVOCs	SW-846 8270C [1]	Water	Cool to 0-6° C	7	40
Iron	SW-846 6010B [1]	Water	Cool to 0-6° C HNO_3 to pH<2	-	180
Chloride & Sulfate	EPA 300.0 [2]	Water	Cool to 0-6° C	-	28
Total Organic Carbon (TOC)	SW-846 9060 [1]	Water	Cool to 0-6° C HCl or H_2SO_4 to pH<2	-	28

Notes:
[1] - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions.
[2] - "Methods for Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983 with subsequent revisions.
SVOCs - Semi-Volatile Organic Compounds
TOC - Total Organic Carbon
VOCs - Volatile Organic Compounds

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

Parameter	*Analyte*	*Analysis Date*	*Blank Result **	*Sample ID*	*Original Result*	*Qualified Result*	*Units*
VOCs	Carbon disulfide	10/31/14	14.3 J	GW-85725-102214-GL-003	13 J	33 U	µg/L

Notes:

* - Blank result adjusted for sample factors where applicable.
J - Estimated Concentration
U - Not detected at the associated reporting limit.
VOCs - Volatile Organic Compounds

TABLE 5

QUALIFIED SAMPLE DATA DUE TO VARIABILITY IN FIELD DUPLICATE RESULTS
MONITORING WELL SAMPLING
EMD MILLIPORE CORPORATION
NORWOOD, OHIO
OCTOBER 2014

Parameter	*Analyte*	*RPD*	*Sample ID*	*Qualified Result*	*Field Duplicate Sample ID*	*Qualified Result*	*Units*
Metals	Iron	51	GW-85725-102214-GL-003	8600 J	GW-85725-102214-GL-004	5100 J	µg/L

Notes:

J - Estimated Concentration
RPD - Relative Percent Difference